

GENERAL AGRICULTURE IN THE DIVISION.

In the Parish of Trelawny, Coconuts, Cattle and Cane, are the main Agricultural Crops; in St. James, Bananas occupy a prominent position, also Citrus and Live-stock and to a lesser degree, Coconuts. A Milk Coddling Depot was established by the Jamaica Milk Products Company, at Montpelier in 1942. In St. Elizabeth all branches of Live-stock production, including sheep are in evidence. In Hanover, Bananas, Cane, Cattle and Coconuts are the major crops, though the acreages under Coconuts in both St. James and Hanover, have steadily decreased in recent years, owing to the ravages of Bronze Leaf Wilt Disease. Panama and Leaf Spot Diseases have also been responsible for reductions in acreages in Bananas in the Banana growing Parishes of St. James, Hanover and Westmoreland. Hanover is also particularly renowned for its yam production. In the flat areas of Westmoreland, Cane is the outstanding crop, while beef and dairy farming and breeding of main stock, are important branches of Agriculture. The cultivation of bananas, however, is restricted to certain areas; Rice growing has received increased attention since the war, chiefly from the East Indian Community and has resulted in the formation of the Westmoreland Rice Growers Association, largely sponsored by the West Indies Sugar Company.

Pimento is to be found at certain altitudes throughout the County, but the crop is scattered and not cultivated; Coffee and Cocoa also occur in confined areas.

Cooperative Marketing of Poultry and Eggs has taken a firm footing in the Seaford Town District of Westmoreland and Newmarket District of St. Elizabeth, while small scale Ginger production is to be found in St. James and Hanover.

There is a Cassava Factory at Bartons, St. Elizabeth, where investigations with Arrowroot cultivation have recently been instituted. In this Parish the canning of fruits and vegetables, and certain cottage or minor industries, such as basket, mat and hat making, are also carried out.

General Agriculture, both with crops and livestock, are followed out in all five Parishes comprising the County; the type of farming practised being dependent largely ^{on} soil and weather conditions. A marked interest has been taken throughout the Division by small and large farmers alike, in livestock and fodder production, also soil conservation methods during the year, particularly in those areas where disease has wiped out the banana crop, for which the work conducted at the Department's Agricultural Station in St. James, and Livestock Improvement Centres, combined with the activities of the Jamaica Agricultural Society, are largely responsible. The establishment of Depots for the purchase of Agricultural products by the Department of Commerce & Industries throughout the Division, has enabled farmers to dispose of their produce without difficulty.

Sugar Cane Factories are established at the following places - Green Park, Long Pond, ^{Hampden and Cambridge in Trelawny} Vale Royal, Barnett, Rose Hall, Ironshore in St. James, -Kew in Hanover, -Appleton, Holland, Raheen in St. Elizabeth, -~~Hampden in Trelawny~~, -Frome in Westmoreland.

Branches of the Jamaica Agricultural Society are established in almost every District of the different parishes of the County, also Loan Banks and Branches of the 4H Clubs. The larger planters and pen-keepers are mostly members of the Banana, Cattle and/or Coconut Associations.

There are some thirty three Land Settlements throughout the County, including two Agricultural Centres, at which training of Ploughmen, Carpenters, Blacksmiths etc., is carried out. There is one Practical Training Centre (Education Dept.) at Knockalva, situated on the borders of St. James, Westmoreland and Hanover, where the students receive inter alia basic elementary training in Agriculture, prior to proceeding to the proposed Students Settlement at Roehampton in St. James.

DEPARTMENTAL TRIALS.

AVOCADO PEAR VARIETY TRIALS.

Two additional trial plots were laid out during the year; one small plot at Newton Farm Agricultural Station, St. James and one larger sized plot at Knockalva Practical Training Centre, Hanover. The twelve plots now established in the Division are shown on the following table:-

<u>Parish.</u>	<u>Property.</u>	<u>Date established.</u>
Trelawny	Good Hope	6/6/41
St. James	Hazelymph	6/6/41
	Friendship (Retirement)	1/9/40
	Seven Rivers	9/10/40
	Newton Farm	10/8/43
	Hazelymph (Commercial trial)	5/6/40
Hanover	Eaton	22/4/41
	Yeardley	1/9/41
	Cousin's Cove	2/6/41
	Knockalva P.T. Centre	29/9/43
Westmoreland	Acton	16/10/40
St. Elizabeth	Barton Isles	13/5/42

The following varieties are being grown on these plots:- Linda, Lula, Collinred, Eagle Rock, Prince, Simmonds, Collinson, Pollock, Fuerte, Dickenson, Dutton, Winslowson, Trapp and Gottfried.

The main work in connection with these plots has been that of cooperating with the owners of the plots concerned, maintaining the plants in good condition and supplying vacancies with the object of having the requisite number of the different varieties established for comparison purposes when they come into bearing and ascertaining the productiveness and suitability of varieties to the Districts concerned, cropping periods and commercial qualities. During the year, fruits of the Simmonds, Pollock, Gottfried and Lula varieties were sent from the Retirement, Eaton and Seven Rivers Plots, to the Department of Commerce & Industries for cold storage trials.

BANANAS (Banana Leaf Spot Disease)

A separate Report is submitted giving details of Banana Leaf Spot Control Work carried out in the Division during the year.

BANANAS (Panama Disease)

This disease continues to spread throughout the banana growing areas in the Division; the main Parishes concerned, being St. James, Hanover and Westmoreland. A survey of the situation was carried out during the year by the Plant Pathologist, as a result of which certain areas were regarded as 'salvage': in Districts where the disease is not so rampant rigorous control by Agricultural Instructors has been continued. A number of banana growers in the Division have agreed to carry out experiments on their properties under the direction of Mr. C.H. Meredith, in connection with the possibilities of bacterial control.

CITRUS.

Advisory work was carried out in connection with the general maintenance of Citrus Groves on numerous properties, including Seven Rivers, Hazelymph, Lilliput, Reading in St. James, Good Hope, Trelawny and Cousin's Cove, Hanover. The main disease of Citrus which occurred were Dieback or Anthracnose (Colletotrichum gloeosporioides) and weather tip (Gloeosporium limetticolum). Botryodiplodia theobromae also occurred. "Eddie" wasps were distributed in St. James, as a means of control of Black Fly. Ants were also a source of trouble in some Orchards. Investigations were carried out in connection with the reported premature falling of citrus fruits, which appears to have been due to somewhat unusual weather conditions experienced in the Districts concerned. A number of planters were supplied with Tephrosia candida Seed for interplanting in their groves as a means of control of fiddler beetle.

CANE NURSERIES.

The Long Pond Cane Nursery, Westmoreland, was closed down during the year, at the suggestion of the All Farmers Island Cane Farmers Association. Estates are now providing Cane Farmers with tops for planting purposes. In the case of Wet Sugar Cane Farmers, a supply of fifty tops each of the following varieties- POJ 2878, POJ 2727, FC 916, and M 28 can be distributed from Government Stations, pending the multiplication of other more simple varieties.

CASSAVA

An area of twelve acres of Cassava was seriously affected by an attack of 'Horn Leaf Catterpillars' at Patty Hill and necessary advice was given as to methods of control.

COCONUTS (Bronze Leaf Wilt Disease).

This disease again continued to spread in the Parishes of St. James and Hanover. In the latter parish the disease made its first appearance at Lances Bay, to the Western End of Cousin's Cove, which had heretofore been free of the disease. The owner of the property in question, the Hon. G.W. Webster, has carried out treatment of his Coconut trees for some years, by applying a mixture of Bluestone, Lime and Salt in proportions of one 1:3:5 to the Heart of the tree.

Treatment at Tryall Property was also carried out, but despite all efforts, a considerable number of trees had to be felled during the year towards the Sandy Bay end of the property to the West, and also towards the boundary of Flint River, property to the East, where all the trees had previously succumbed to the disease. The property Orchard has also been seriously affected, while the bulk of the trees at Haughton Court, now an Agricultural Centre, which formerly produced upwards of three quarters of a million nuts, have been felled. A series of experiments are being conducted at this Centre by the Plant Pathologist. In view of the fact that certain planters in Hanover had attempted their own treatment of the disease for several years, arrangements were made with the Banana Leaf Spot Control Board, for the release of a supply of Copper Sulphate, which was otherwise unobtainable, to enable them to continue such treatment which was also started, though at a later date, by Good Hope in Trelawny.

The disease also made its appearance in the Western portion of Trelawny, in which Parish a Vigilance Committee was formed to watch for its appearance on the trees, and arrange for immediate felling. Under the Bud Rot and Wilt Disease of Coconuts Order 1943 (The protection from Plant Disease (Plants) Law), which came into force on December 9th., 1943, Coconut trees infected with this Disease have to be

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immediately cut down and the crown thereof burned with fire, so as to char the centre. Control measures were carried out in the Division under the instruction of the Plant Pathologist, by Agricultural Instructors of the representative areas, through the Supervisor, Jamaica Agricultural Society, and with the cooperation of growers and planters concerned. The number of trees felled during the initial clearance was:-

St. James	715
Trelawny	2218
Hanover	<u>18340</u>
Total	<u>21273</u>

SANTOY CITRUS NURSERY.

This Nursery was started in April, 1942, and seeds sown in May. One hundred plants were budded in June 1943 by Instructor Samms and the Caretaker, of which only four caught owing to the very rainy weather conditions. Buds from Marsh Seedless Grapefruit, Valencia and Navel Orange Stocks, were supplied from Newton Farm.

In December 1943, four additional buds were made and in January 1944, seeds were sown, but failed to germinate owing to terrific drought. More seeds were sown in March 1944, which have started to germinate. Forty plants were budded in April 1944. There are now six hundred seedlings available for budding. No budded seedlings were distributed during 1943.

RICE & WESTMORELAND RICE GROWERS ASSOCIATION.

The Agricultural Instructor for the District reports that since the inception of this Association in June 1942, the Association has had a marked effect on Rice Growing in the Parish and Island. During the first year the Association offered and advance of twenty shillings per hundred quarts, this being five shillings higher than the previous 'ceiling' and subsequently paid just over thirty six shillings per hundred weight for the 1942/43 crop. This increase in price encouraged Rice growers to increase their efforts and attracted new growers into the field. The membership of the Association increased from 830 in April, 1943, to 1020 in March 1944, despite the antagonism of large interests in the Parish and adverse effects occasioned by the lack of understanding on the part of some members of the Association of Cooperative principles.

Some 1600 acres of land was handled by members during the year and loans granted on the 1943/44 crop amounted to some £750, of which less than \$100 has not been paid to date. The quantity of Rice hulled totalled some 150,000 quarts 'dahn', or some 280,000 lbs. of hulled Rice: slightly over 138,000 qrts. 'dahn' were hulled during the months of February and March 1944. The Association charges 4/- per 100 qrts. for hulling members stock and 5/- per hundred qrts for hulling nonmembers stock. During the period March to January 1942 the old huller milled some 1,000 quarts per day and from June 1943 to July 1944 the new huller milled 2,000 quarts per day. In February & a larger huller was obtained, capable of hulling 4,000 quarts per day.

The selling price of Rice was 8d per lb. to start with and increased to 9d. per lb. in November 1943. Outside the Association the price of Rice rose at one period to 1/9 per lb., but later fell back to 1/- per lb.

From the scanty information obtainable, it appears that some 4,500 acres is estimated for the 1944/45 crop, compared with 4,000 in 1943/44. The cost of the production is estimated to vary from \$10 per acre, where little or no labour is employed and old fields are worked, to \$25 per acre in the case of new fields, where labour has to be employed. Rental figures vary from 7/- per acre on sections

of the West Indies Sugar Companies Lands to 50/- per acre. Payment in 'dahn' at the rate of 300 quarts per acres, was demanded in some instances in early 1944, which at 40/- per 100 qrts. would mean \$6 per acre. The price of last year's stock vary from £3.10. to £6 per acre.

The success of the Westmoreland Rice Growers Association is chiefly due to the encouragement given by the Management of the West Indies Sugar Company, Frome, which Company made some 700 acres of land available for nonmembers; while the work of Mr. R.C. Tavares, the first Secretary of the Association, who was later succeeded by Mr. A. P. Atkinson, and that of Messrs. L.A.M.B. Coke and N.A. Gayle, must also be commended. The affairs of the Association are directed by a Managing Committee, under the Chairmanship of Mr. A.C. Barnes and Vice Chairman, Hon. M.A. Segre, M.L.C., Westmoreland, who has also taken a great interest in the affairs of the Association.

FOOD PRODUCTION.

Work in this connection falls under the supervision of the Supervisors and Instructors of the Jamaica Agricultural Society and Local Committees, acting on behalf of the Central Food Production Coordinating Committee. Increased areas were planted with Foodcrops throughout the Division during the year and no acute land shortages were recorded. Following the acquisition or lease of lands by the Food Production Board Coordinating Committee, increased areas were planted up with yams. Heavy rains in March and April affected corn crop in 1943. The outlook for 1944 is not satisfactory, owing to drought conditions from December to March 1944 in most areas, and consequent failure of plantings.

The following quantities of Produce were purchased by the Anchovy Branch, St. James, of the Department of Commerce and Industries:-

<u>Ground Prov.</u>	Yams	4651929	lbs.
	Yampies	20961	"
	Cocoas	17241	"
	Sweet Potatoes	373434	"
	Pumpkins	57299	"
	Peanuts	61	"
<u>Vegetables.</u>	Tomatoes	16790	"
	Turnips	10796	"
	Carrots	990	"
	Cabbages	93919	"
	Chochos	122911	"
	Cucumbers	9462	"
	Egg Plant	276	"
	String Beans	129	"
	Hot Peppers	650	"
	Squash	9	"
	Spinach	18	"
	Vegetable Marrow	156	"
<u>Pulses.</u>	Red Peas	16405	"
	Cow, Congo etc.	84488	"
	Beans	1167	"
<u>Fruits.</u>	Plantains	7455	"
	Pawpaws	7	"
	Pineapples	687	"
	Guinea Corn	6448	"
	Irish Potatoes	9368	"
	Red & Yellow Corn	1896971	"
	Sun Flower Seeds	53	"
	Cassava	214898	"
	Castor Oil Beans	777	"

LIVESTOCK.
Extension & Development.

Thirteen Livestock Improvement Centres are now established in the Division. Two new Centres were established during the year, one at St. Leonards and the other at Hopeton, both in the Parish of St. James. The Glasgow Centre was removed to Latium Land Settlement. There are no subsidised sires in the Division.

The following list shows Centres now established in the Division; -together with the numbers and types of sires available for service:-

<u>Parish.</u>	<u>Centre</u>	<u>Date Estb.</u>	<u>Bulls.</u>	<u>Sires</u>			
				<u>Rams.</u>	<u>Boars.</u>	<u>Bucks.</u>	<u>Jack</u>
<u>St. James</u>	Latium	April 1940	1	2(g)	1		
	Flamstead	April 1940	1	2(g)	1		
	St. Leonards						
	Hopeton						
<u>TreDawny</u>	New Forest	" "	1	1	1		
	Spring Garden	March 1940	1		1		2
<u>Westmoreland</u>	Greenwich	April 1940	1	1	1		1
	Blue Castle	April 1941	1	1	1		
	Darliston	April 1940	1	1	1		
	Petersfield						
<u>St. Elizabeth</u>	New Market	April 1940	1	2	1		
	Melksham	March 1940	1	1sheep			2
	Newell	March 1943	1	2	1		
	Beunavista	March 1940	1	1	1	1	1

These Centres are administered by the Livestock Field Officer, Central Division, stationed at Grove Place. The new Livestock Centre at Santa Cruz was completed in April, but is not yet in operation; at Maggoty, a site has been selected, and at Oxford, a Centre is in the process of establishment.

It is hoped to place Buck rabbits at all these Centres during 1944/45. Under the existing organisation in the Western Division, Agricultural Instructors are responsible for the general supervision of the Caretaker, maintenance of feed and supplies and upkeep of these Stations, through the Supervisor to the Senior Agricultural and Livestock Field Officers, who in turn are responsible to the Senior Livestock Officer.

FIELD DAYS were held at Livestock Centres from 3rd to 9th July, 1943: that held at Flamstead Mtn. was particularly successful.

GENERAL. The Livestock Field Officer reports as follows:-
 In addition to the general supervision of the Livestock Improvement Centres, I carried out advisory work at Agricultural and Training Centres and numerous properties in the Division.

Weather- Generally speaking, conditions during the year were exceptionally dry, especially from November 1943 to March 1944.

Feed & Pastures- Owing to the drought, the production of feed was greatly reduced, although pastures were on the whole, maintained in better condition. Li

Livestock General.-A marked improvement is taking place in the type of Livestock reared, now that breeders realise the value of using good sires. The only draw back is the limited number of these available sires. The majority of animals still show effect of parasitic infestation, as some breeders

have not yet fully realised the havoc brought by these pests. It is, however, hoped that they will profit by their experience and hence be able to avoid further losses from this cause. A number of deaths occurred among young stock. These were chiefly due to exposure, parasitic infestation and improper feeding.

Cattle - The Jersey breed of dairy cattle in the Division is the outstanding breed, they stand up to conditions and give much better results than the Holsteins or Guernseys - even those Breeders which have favoured Holsteins and Guernseys in the past, are now introducing Jersey blood. In the case of Beef Cattle, the Aberdeen Angus and the Devon Breeds are gradually taking the place of the Herefords, as these breeds give better returns for the feed used and the mortality amongst the calves is much less.

Disease Outbreaks Amongst Cattle - Blackleg is fairly widespread throughout the Division, but very little loss was sustained during the year, as vaccination against this Disease was carried out extensively. Tick Fever - three cases occurred in the following areas:- Saddlers Hall-Manover, Maroon Town-St. James, Brighton-Westmoreland. Only nine animals were lost.

Pigs. The premier breed in the Division is the Berkshire. The Tanworth is, however, increasing in popularity, even though it is not as adaptable to average conditions, as the Berkshire.

Disease Amongst Pigs- One case of Swine Fever broke out at Cambridge, St. James. This disease was quickly checked by vaccination.

GOATS. Goats thrive well on the rocky upland slopes and are gradually increasing in number; the main breeds are Anglo Nubian and Toggenburg. The small number showing effects of parasitic infestation are to be remarked on.

POULTRY - The types of fowls kept are very poor representatives of their respective breeds and although the output of eggs is increasing, it is doubtful whether the small farmers are benefitting to any extent, since numbers of intelligent farmers have reverted to back yard poultry farming and given up the commercial side as a most unprofitable venture. This may be accounted for by the poor type of chicks imported, lack of sanitation and high cost of feeds.

RABBITS- Rabbits are not very popular amongst the peasants at present, but every effort is being made to encourage the rearing of these animals.

JAMAICA MILK PRODUCTS.

The following table shows the quantities of milk handled by the Jamaica Milk Products Co. during the years 1943 and 1944:-

	<u>1942-43</u>	<u>1943-44</u>
April		18748
May		27316
June	46978	23855
July	32111	31700
August	25589	28113
September	24054	25988
October	23127	23891
November	18644	19905
December	14246	19938
January	12746	14725
February	10839	9946
March	14711	2140
Total	<u>223015</u> Quarts	<u>232265</u> Quarts

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The noticeable drop in quantities of milk handled during the months of February and March may be accounted for by the dry weather conditions experienced in many Districts and the resulting lack of water supplies.

The milk collection routes in operation during the year were as follows:-

1. Sav-la-mar, Amity, Ferris, Calloway Corner, Withorn, Montpelier.
2. Ghester Cattle, Bethel Town, Straie, Barneyside, Cornwall Mtn., Mackfield, Montpelier.
3. Mount Carey, Anchovy, Lethe, Copse, Sav-la-mar, main road to Montpelier.

New routes proposed are:- Flamstead - Montpelier and Great Valley - Montpelier.

SOIL EROSION CONTROL WORK.

The following table gives a summary of the work which was carried out on Stations and Centres, which fall under the control of the Senior Agricultural Officer:-

Newton Farm	77 $\frac{1}{2}$ acres	Miscellaneous Grass barriers.
Ducketts	2 $\frac{1}{2}$ acres	Contour trenches, stone or grass
Irwin Agric. Centre	122 acres	barriers, strip and bench
Haughton Court A/Centre	36 acres	terracing etc.
Livestock Imp. Centres	5 acres.	
	<u>242$\frac{1}{2}$</u>	"

In addition the following acreages are reported to have been planted with grass and/or stonewall barriers, or terraces, Contour trenching, strip cropping etc., by Agricultural Instructors in their various Districts:-

<u>Under Supervisor C.C. Hastings.</u>		
<u>District No.</u>		<u>Acreage.</u>
E.U. McNamee	42	881 $\frac{1}{2}$ acres
A.D. Arnaud	44	15 "
E.M. Carey	43	19 $\frac{1}{2}$ "
A.L. Robinson	41	32 $\frac{1}{2}$ "
N.H. Mullings	40	- "
C.L. Harrison	47	30 "
E.U. McKenzie	46	118 "
N.A. Gaylo	39	5 "
D.J. Phillips	37	130 $\frac{1}{2}$ "
		<u>1232</u>

Under Supervisor W.D. Marr.

L.A. Russell	38)	
G.R. Graham	39)	
A.S. McKenzie	40)	Information requested, but not forthcoming.
A. Jobson	34)	

Under Supervisor C. Robotham.

V.S. Reid	25)	
O.E. Gardiner	23)	Information requested, but not forthcoming.
L.D. Phillips	24)	

The total area on which soil conservation methods of one type or other have been practised, therefore, amounts to some 147 $\frac{1}{2}$ acres. In addition, many Gene cultivations are planted on the contour.

It is of interest to note that planters and small farmers have taken an increased interest in soil erosion control work during the year under review and a further increase in acreages is anticipated in the future.

LAND SETTLEMENT.

There are thirty three Land Settlement Properties in the Division, including two Agricultural Centres,-

Four in the Parish of Trelawny	totalling	6,779	acres
Seven in the Parish of St. James	"	5,911	"
Seven in the Parish of Banquer	"	6041	"
Seven in the Parish of Westmoreland	"	5,607	"
Eight in the Parish of St. Elizabeth	"	7,789	"

AGRICULTURAL CENTRES.IRWIN.

General. According to the latest survey, the acreage of this Centre is 528 acres, excluding the Land Settlement areas. The average number of male and female unemployed employed during the year was 426; the figure fluctuated according to the local demand for labour. The greater portion of the work carried out by male workers was on a task basis and in the case of female workers, on a daily basis. The average weekly earnings for task work was 10/6 and for daily paid work 11/6 for men and 4/9 and 5/8 respectively for women - the average time taken for task work being 4 days and for day work 4½ days.

CROPPING.

The approximate acreages at the end of March 1944, were as follows:-

<u>Permanent Crops.</u> Cane (85), Pulses, Rice, Corn, Guinea	
Corn, Adlay, Sweet Potatoes	133 acres
<u>Miscellaneous Newly Imported Crops-</u> Citrus (46)	
Cashew (3), Plantain & Bananas (5)	55 "
Pastures, Commons etc.	200 "
Afforestation (40) Wastelands (30)	70 "
Habitations, Recreation Ground,	
River & Roads etc.	60 "
Nursery	10 "
	<u>528</u> "

It is proposed to increase the area under Cashew and also to plant six different grape varieties during the coming year.

Programme of Work. A plan of development for this Centre was submitted by the Senior Agricultural Officer in April, 1943 and has been carried out during the year ~~as far~~^{as far} as circumstances permitted. The programme aims at establishing the Centre on a mixed farming basis with the incorporation of soil erosion control work, implemental tillage, afforestation on these areas which are totally unsuitable for arable or pastureland, for which purpose considerable preliminary clearing and development work is called for. Regular visits were paid to the Centre during the year, following which, programmes of work were drawn up for the guidance of the Superintendent, and copies forwarded to the Director of Agriculture, Supervisor, Agricultural Centres, and District Lands Officer. Close cooperation was maintained with Officers of the Lands Department and additional visits were paid to the Centre with the Commissioner of Lands and Supervisor Agricultural Centres, on the occasion of their inspection of Centres in the Division.

Grasses. A suitable area of miscellaneous grasses was established for observation and multiplication for fodder, pasture and soil conservation purposes.

Livestock. The requisite number of cows, pigs and poultry will be obtained when the necessary buildings have been erected and feed supplies are available. The necessary plans have been prepared and sites selected.

Soil Erosion Control. An area of some 122 acres has been established with contour grass barriers and stone terraces up to date. Work in this direction will be continued. The multiplication of suitable grass barriers continues.

Afforestation. Lands unsuitable for other purposes were prepared for planting during the year, but the difficulty of obtaining necessary seed supplies from the Forestry Department, or other sources and dry weather conditions, handicapped the proposed planting programme.

Miscellaneous Crops. Seeds of the following were supplied for observation and multiplication purposes:- Overlook Bean (*C. ensiformis* and *C. plagiocarpa*), *Tephrosia candida*, Edua Pea, Somerset Velvet Bean, Bonavist Bean, *Crotalaria*, *Calopogonium*, *Stramonium*, *Urena Lobata*, Sunflower, Sesame, Cluster Bean, Indigofera, Chinese Red Cow Peas, Mung Bean (Green & Black Grams), five Hill Rice varieties.

Cuttings of St. Vincent Plum (*Gliricidia maculata*), Demerara Mimosa, Guatemala, Elephant, Napier, Molasses, Khus Khus and Lemon grasses, Cane Tops of varieties B3472, PR 803, Co 281, B 3254.

Weather Conditions. A Total of 50.32 inches of rain was recorded during the year, the heaviest fall being 4.25 inches on the 3rd April. Considerable damage was done to the Banana, Corn and Peas Crops by the heavy rains and winds experienced towards the end of October.

Water Supplies. In order that the proper development of the Centre may take place, capital expenditure for the necessary irrigation is called for. The installation of a pumping plant for supplying water to the Superintendent's quarters and proposed Dairy Shed was started in February 1944, while work on the old canal was put in hand in December, 1943.

Roads & Fences. Extensive work was carried out with roads and fencing of proposed pasture areas during the year.

LANDHOLDING COURT.

This property comprises some 2,266 acres of land and was taken over on the 4th April, 1943 and run on property lines for the first six months, pending the decision of the Central Committee, as to whether it should be utilized for Land Settlement, and/or building purposes, or as an Agricultural Centre. The latter purpose was finally decided on.

Labour. The average number of labourers employed up to the 31st March, 1944, was 403, consisted of 276 task and 127 daily paid labourers: the average weekly earnings in the case of male labourers employed on task work was 10/5 and daily paid 10/2; in the case of female labourers 5/2 and 5/5 respectively, for an average of four eight hour working days.

Cropping. At ^{The} time the property was acquired, the following were the approximate acreages:-

Bananas	100
Canes	174
Limes	190 (in bananas, Coconuts and one Commons)
Coconuts	308
Grazing, Woodland, Tenants & Swamp	1494
	<u>2266</u> acres.

The banana and cane crops were in poor condition, while the coconut areas were seriously affected with bronze leaf wilt, and pasture lands were mostly in a semi-ruinate condition. Programmes of work were, therefore, immediately set in hand, which called for replanting of certain banana and cane areas, the felling of diseased coconut trees and improvement of pastures - unfortunately, progress was hampered by weather conditions. The bulk of the Coconuts were, however, felled during the year and bananas, canes, limes and pastures, showed marked improvement. The lime crop is distilled by means of a plant taken over with the property, and sold for export purposes.

Lines are also purchased from local growers; there are possibilities of establishment of a promising little industry in this direction.

Crops of Soya Beans, Adlay, Blackeye and Caroline Peas and yams were planted during the year. Heavy rains did considerable damage to the Soya Bean Crop, while weather conditions and crabs caused poor results from the Adlay Crop. An area of three acres were planted up with Cashew. A series of experiments were carried out by the Plant Pathologist in connection with Coconut Bronze Leaf Wilt.

Implemental tillage, both mechanical and animal, is being utilised at the Centre and the training of labour has started in this direction, also in carpentry and blacksmith work.

Grasses. Small areas were planted up with Guatemala, Elephant, Napier, Lemon and other grasses, for observation and multiplication, for fodder, pasture and soil conservation purposes.

Livestock. A total of 469 head were taken over with the Centre comprising of Bulls, breeding cows, one to three year old heifers, of the Hereford, Aberdeen Angus, Shorthorn and Red Poll Breeds - steers and working mules. A definite breeding programme is to be adopted whereby it is proposed to build up and maintain in the future, beef and dairy herds at the Centre. The advice of the Senior Livestock Officer is being followed out in this connection. Building programme for Cow Sheds, piggeries and Poultry, are proposed for 1944.

Soil Conservation. A total of thirty six acres was completed with contour grass barriers, contour trenches, strip and contour planting, during the period under review.

Nursery. An area of ten acres was prepared for the production of fruit trees, economic plants and timber tree seedlings for afforestation purposes. Considerable trouble was experienced from land crabs.

Miscellaneous Crops. Seeds of the following were supplied for multiplication and observation purposes: Sunflower, Soya Beans, Canavalia (*ensiformis* and *plagiocarpa*); Somerset Velvet Beans, Edna Pea, Bonavist Bean, Calopogonium, Sesame, Crotonaria, Adlay and Jerusalem Pea.

Weather Conditions. Somewhat abnormal weather conditions were experienced during the year. A total of 57.43 inches was recorded for the period April 1st., 1943 to March 31st., 1944. High winds did considerable damage to banana, cane, citrus and under crops at the end of October, while drought conditions were experienced from December to March.

GRASS EXPERIMENTAL PLOT - GOLD HORN.

This experiment, started in 1942, was designed with the object of ascertaining the possibilities of the control of *Themeda arvensis*, locally known as 'baleq', or 'rimo', or 'Christmas' grass, by means of other indigenous or exotic grasses. Four plots of each of the following varieties are at present established on individual plots:-

	Grass
<u>Cynodon dactylon</u>	Bahama or Dhub
<u>Trisetum laxum</u>	Guatemala
<u>Andropogon pertusus</u>	Amphilophis Seymour
<u>Amphilophis pertusus</u>	Amphilophis
<u>Melinis minutiflora</u>	Brazilian molasses
<u>Panicum coloratum</u>	Panicum
<u>Digitaria pruriens</u>	Swaziland Finger
<u>Pennisetum purpureum</u>	Elephant
<u>Chloris gayana</u>	Rhodes
<u>Panicum maximum</u>	Guinea

When all plots are fully established, the Piano Grass on adjacent plots and the various grasses concerned, will be allowed to compete with each other in order to ascertain which, if any, of these will eradicate or control the Piano Grass. Other grasses such as *Sotrochloa insculpta* will replace the less promising grasses and those which are not likely to be of value for livestock, as the experiment proceeds. Control of Piano grass by chemical and cultural methods and burning, previously tried out, proved expensive or ineffective, consequently it is spreading rapidly throughout the Division, particularly in the parishes of St. James and Hanover and to a lesser degree in Westmoreland and St. Elizabeth.

With the advent of mixed farming and the necessity of establishing pastures, this grass will prove a menace to the development of the Livestock Industry. Consequently, research work in this direction is urgently called for. The possibilities of suffocation by cutting and mowing before the plants seed, appear to be worth investigating. In the meantime, legislation is called for in those areas where this grass is not of economic value.

JAMAICA AGRICULTURAL SOCIETY.

Once again the closest cooperation was maintained with the Supervisor and Instructors of the Jamaica Agricultural Society. The success of the existing organisation has been largely due to the fact that the Supervisor and the Senior Agricultural Officer have occupied adjoining Offices since the Society appointed a Supervisor in the Western Division in 1939. The assistance of the Instructors concerned was particularly valuable in connection with the establishment and reporting on Avocado Pear Variety Trial Plots, the supervision of Livestock Stations, reports on cultivation and spraying activities under the Banana Leaf Spot Control scheme, dealing with Panama Disease control work, Coconut Bronze Leaf Wilt and assisting with other Departmental Experiments, or trial plots in the Division. Unfortunately, for purposes of administration, the whole of the County of Cornwall does not fall under the Supervisor, Western Division "F", since portions of St. Elizabeth and Trelawny are under the jurisdiction of the Supervisors, Division "C" and "E".

AGRICULTURAL SHOWS.

(a) A number of Agricultural Shows took place in the Division during the year, the most outstanding being that held at Freetown, Westmoreland, in January which was even more successful than that previously held. A successful Livestock Show also took place at Plumstead Mtn., St. James. I consider such shows to be not only an impetus, but also of great value to Agricultural Development Work generally.

(b) Newton Farm. Invitations were extended to the Custodes and M.L.Gs. Jn. Assn. of Banana Growers, County of Cornwall, Manager and Staff of the West Indies Sugar Company, Freetown, Colleges and Schools, Planters and Farmers, in this Division, to visit Newton Farm Agricultural Station.

(c) 4-H Clubs. There are now thirteen 4-H Clubs in Westmoreland, eleven in St. Elizabeth, and three each in the parishes of Hanover, Trelawny and St. James, bringing the total number in the County of Cornwall to thirty three. This is an increase of eleven Clubs as compared with January 1943.

LIBRARY. The Divisional Library at Freetown Bay now contains a total of some six hundred publications, chiefly U.S.D.A. Farmers Bulletins, pamphlets and Journals and Departmental publications and Reports, which have been listed and indexed. The addition of a number of standard Agricultural Books has been a great asset and frequent use has been made of the Library by the Staff of the Western Division, Members of the Agricultural Society, Education Dept., Lands Dept., Planters and Farmers and Students.

MEETINGS & COMMITTEES.

I attended the following Meetings & Committees during the year:-

Regular quarterly meetings of the Crookalva Practical Training Centre Advisory Committee.
 First Annual Meeting, Westmoreland Rice Growers' Assn. Bay-la-mar.
 Divisional Meeting with Supervisor and Agricultural Instructors of the Agricultural Society.
 Half-Yearly Meetings of Hanover, St. James and Westmoreland Branches Associated J.A.S.
 Jamaica Assn. of Banana Growers, County of Cornwall.
 St. James, Hanover and Westmoreland Food Production Committees.
 Newton Farm Agricultural Station Committee.
 No meetings of the Arbitration Authorities (Sugar Industry Control Section 26(2)), for the parishes of St. James, Hanover and Westmoreland, were held during the year.

I was unable to attend the half-yearly meetings of the Jamaica Agricultural Society in Kingston, owing to pressure of work.

I was appointed an Inspector under Section (12)1 of the Fertiliser & Feeding Stuffs Law 1942, in July 1943.

CORRESPONDENCE.

A total of 7,575 letters in and out was dealt with during the period 1st April, 1943 to 31st March, 1944.

WEATHER.

During the early part of the year excessive heat was experienced in many parts of the Division, combined with a period of extreme humidity, followed by heavy rainfall. A weather disturbance took place on October 25/26th, 1943, which caused serious damage to the banana cultivations in Hanover and St. James, also the yam, rice, corn and ground provision crops in Westmoreland and to a lesser degree to Coconuts, Citrus and Breadfruits, particularly along the coastal belt. Drought conditions prevailed in most areas from December to March 1944.

STAFF.

Mr. J.R.V. Smyth, Senior Agricultural Officer, 1st April, 1943 to 31st March, 1944.
 Mr. T.P. Lecky, Livestock Field Officer, transferred to Hope on 1st August, 1943.
 Mr. L.W. Gray, Livestock Field Officer, was appointed vice Mr. Lecky and assumed duty on 17th August, 1943.
 Miss. Kirkaldy, Steno Typist, 1st April, 1943 to 31st March, 1944.

BANANA LEAF SPOT CONTROL WORK: WESTERN DIVISION

FIELD SUPERVISION:-

The supervision of registered growers entitled to materials and equipment was carried out by the same personall as the previous year; namely the Leaf Spot Committee, comprising the representatives of the three Fruit Companies, the Senior Supervisor and his Field Staff of four Junior Supervisors, and four Headmen; the Government Spraying Instructor for the Division was responsible for the supervision and directions generally. As was the case last year the Junior Supervisors and Headmen were stationed in the various banana growing Districts of the County.

DISTRIBUTION DEPOTS:-

Six Distribution Centres, or Depots, were operated by Station Masters on the Railway Line, from Anchovy to Ipswich, three by the Leaf Spot Control Board at Montego Bay, Lucea and Green Island, and six sub-depots by the Leaf Spot Committee, at Welcome Hall, Summer Hill, Sunderland, Somerton, Huntley, York. A new depot was opened at Niagara in December to facilitate growers drawing materials from Ipswich, where transportation had become difficult, thereby bring the total number of depots operating in the Division to sixteen, at the end of March 1944. The stock of materials at all depots was taken twice during the year, namely in September and March. Regular visits of inspection were paid to these depots by the Spraying Instructor. The operation of sub-depots by the Leaf Spot Committee has been of great assistance to the small growers in enabling them to carry out regular spraying cycles and has doubtless assisted in accounting for the marked increase in spraying activities during the Summer months, to which reference is made later. It is considered that the establishment of these sub-depots materially assisted in the success of the Summer spraying Campaign recommended by the Leaf Spot Mycologist.

The following table shows the number of growers who drew materials from the various depots and the actual amounts drawn for the year ending 31st. March 1944.

DEPOT	NUMBER OF GROWERS	TOTAL QUANTITY MATERIALS DRAWN.			
Anchovy	2	176	lbs C/S	240	lbs lime
Cambridge	35	35	tons "	43	tons "
Catadupa	84	16	" "	21	" "
Green Island	65	45	" "	59	" "
Huntley	661	7	" "	9	" "
Ipswich	34	6	" "	7	" "
Lucea	68	26	" "	36	" "
Montego Bay	57	162	" "	212	" "
Montpelier	27	1	" "	1	" "
Niagara	47	1	" "	2	" "
Somerton	55	8	" "	11	" "
Stonehenge	84	17	" "	17	" "
Summer Hill	88	14	" "	19	" "
Sunderland	36	6	" "	8	" "
Welcome Hall	120	10	" "	14	" "
York	41	5	" "	6	" "

It was carried out by the same personnel as the previous year. The land was surveyed by the same party, and the same method was used. The survey was made by the same party, and the same method was used. The survey was made by the same party, and the same method was used.

The distribution of the land was as follows: The land was divided into two parts, one of which was given to the State, and the other to the Federal Government. The land was divided into two parts, one of which was given to the State, and the other to the Federal Government. The land was divided into two parts, one of which was given to the State, and the other to the Federal Government.

The following table shows the number of acres of land in each section, and the total number of acres in each section. The following table shows the number of acres of land in each section, and the total number of acres in each section.

TABLE 1. - LAND IN EACH SECTION.

Section	Acres	Total
1	100	100
2	100	100
3	100	100
4	100	100
5	100	100
6	100	100
7	100	100
8	100	100
9	100	100
10	100	100
11	100	100
12	100	100
13	100	100
14	100	100
15	100	100
16	100	100
17	100	100
18	100	100
19	100	100
20	100	100
21	100	100
22	100	100
23	100	100
24	100	100
25	100	100
26	100	100
27	100	100
28	100	100
29	100	100
30	100	100
31	100	100
32	100	100
33	100	100
34	100	100
35	100	100
36	100	100
37	100	100
38	100	100
39	100	100
40	100	100
41	100	100
42	100	100
43	100	100
44	100	100
45	100	100
46	100	100
47	100	100
48	100	100
49	100	100
50	100	100
51	100	100
52	100	100
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56	100	100
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64	100	100
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66	100	100
67	100	100
68	100	100
69	100	100
70	100	100
71	100	100
72	100	100
73	100	100
74	100	100
75	100	100
76	100	100
77	100	100
78	100	100
79	100	100
80	100	100
81	100	100
82	100	100
83	100	100
84	100	100
85	100	100
86	100	100
87	100	100
88	100	100
89	100	100
90	100	100
91	100	100
92	100	100
93	100	100
94	100	100
95	100	100
96	100	100
97	100	100
98	100	100
99	100	100
100	100	100

EQUIPMENT:-

Twelve different types of equipment were again used during the year - they were:-

Spray Motor	Vermorel Headland
Vermorel Neo Leo	Drake & Fletcher Headland
Four Oaks Barrel Pump	Leader Senior
Hardie 4 $\frac{1}{2}$	Edwinson Barrel Pump
Hardie XV	Hardie 6
Leader Junior	Hardie 99

These units have been in service for a considerable time, some for over four years, and have stood up well to the continuous useage, and not infrequent rough handling. Replacements for worn parts were very difficult to obtain, due to the restrictions on importation of new parts, nevertheless the majority of units were kept in service by the substitution of parts produced locally. In this direction the ingenuity of a certain grower, who produced and supplied washers for all types of hand operated units is worthy of mention, as it saved a critical situation. Hand operated units are rapidly becoming unservicable from the wear and tear entailed by length of service, and during the year under review 52 such units had to be withdrawn from service. Five new Leader Junior units only were received as replacements.

A quantity of new half inch high pressure and three-eighths inch hose was received and distributed to growers to replace a portion of their stock which had become unservicable through normal wear and tear.

SPRAYING MATERIALS:-

Temper lime was supplied by the West Indies Sugar Co. Ltd., processed at the Montego Bay Central Store and distributed to depots and growers in the Division. Copper Sulphate was supplied from Kingston and redistributed from the Montego Bay Central Store. 361 tons Copper Sulphate and 461 tons lime were issued during the period under review. Locally produced hydrated lime was found to contain a certain percentage of indissoluble matter which tended to reduce the proportion of the mixture, the issue was therefore increased from 10 lbs to 12 lbs per acre, to compensate this loss. The average number of growers registered for the year was 1200; of this number a total of some 800, or 66 $\frac{2}{3}$ % drew materials. The average number of growers who drew materials each month was 500, or 41 $\frac{2}{3}$ %. Although the average number of growers who drew materials regularly was approximately 41 $\frac{2}{3}$ %, the average quantity of materials drawn monthly was 60% of the total quantity which should have been drawn, indicating that the bulk of materials was drawn by growers with over 50 acres.

INCIDENCE OF INFECTION:-

Incidence of infection during the period under review was similar in every respect to the previous year, except that a long and protracted drought which started during the month of December and continued to the end of March appears to have materially assisted in the rapid and early recovery of the trees from the effects of a very heavy ascospore infection during the Winter. There was a steady rise in the infection from June to February and it fell suddenly from very bad to medium, then to moderate. The lowest point of attenuation was between the middle of April to the end of May, the previous year. The regularly sprayed areas maintained a good commercial control throughout the year. There were, however, some which did not respond satisfactorily to intensive spraying due to certain soil conditions conducive to out-of-season ascospore infection which occurred chiefly in the Montego Bay River Valley and Great River Valley.

SPRAYING ACTIVITIES:-

There was a considerable revival of spraying activities amongst both the large and small growers during the period under review, due to the institution by the Leaf Spot Mycologist of an intensive spraying campaign during the months of March to October, following the results of experiments which proved conclusively that during this period infection was more virulent than from November to April. The establishing of the Industry by Government played a great part in encouraging growers to carry out regular spraying cycles. Seventeen trial plots were established in the Division comprising over 200 acres on which the growers carried out regular three weekly spraying cycles. The Leaf Spot Mycologist paid regular quarterly visits of inspection and took records of infection from each plot: on the occasion of his last two visits he was accompanied by representatives of the three Fruit Companies. The results obtained proved that infection can be controlled by regular three weekly spraying cycles from March to October, and once cycle each in November and December, also that spraying in January and February has relatively no effect. There were, however certain areas on which the soil conditions were of such a nature as to render control of out-of-season ascospore infection ineffective by spraying. The spraying activities of growers increased steadily from 45% in April to 89% in November, after which there was a sharp decline to 70% in December dropping to 50% in March. The decline from December to March may be attributed to severe drought conditions which prevailed, with the consequent shortage of water, unsettled labour conditions, and the fact that the cane crop absorbed a large portion of the available labour during this period.

ADVISORY VISITS:-

The Spraying Instructor paid regular visits to growers in the Division and checked up on equipment, materials, acreages and spraying.

LIME HYDRATION:-

Temper lime was supplied by the West Indies Sugar Co. Ltd., and hydration was carried out at the Montego Bay Central Store. 395 tons temper lime was processed, which yielded 474 tons hydrated lime. The premises owned by the Public Works Department which were used for hydration purposes had to be vacated in favour of the Marketing Department, in December 1943. Suitable accommodation for this work was obtained from Messrs Crichton Bros.

REGISTERED GROWERS:-

The number of registered growers entitled to draw materials on the 1st. April 1943, was 1271. 178/^{new} growers were registered during the year and 362 cancelled, leaving a total of 1097 on the 31st. March 1944.

STAFF:-

The Staff consisted of Mr. W.S. Whittingham, Spraying Instructor, who proceeded on vacation leave in May and was succeeded by Mr. N.E.C. Thomson, formerly Spraying Instructor, Eastern Division, in June, and Mr. W.B. Cannicle, Clerical Assistant, Miss L. Lynch, Stenographer and Typist, transferred to Lands Dept., Kingston, in November and was succeeded by Miss J. Owen.

ANNUAL REPORT - NEWTON FARM AGRICULTURAL STATION

1st April, 1943 to 31st March, 1944.

Following a survey carried out during the year, the total acreage of this station is some 130½ acres. The following table gives details of areas of individual fields:-

<u>Fields.</u>	<u>Crops.</u>	<u>Experiments.</u>	<u>Approx.Areas.</u>
1A	Bananas	Trashing	1.25 acres
1B	Rotations	Homestead	7.75 "
1C	Rotations	Peasants' Cultivation	4.00 "
11A	Rotations	Matengo	2.00 "
11B	Rotations	Cassava Varieties	2.50 "
11C	Rotations	C.D.O. Misc. Crops	6.75 "
111	Bananas	Cover Crops	5.25 "
1VA	Bananas	Lacatan (Proposed Manurial trial)	2.00 "
1VB	Bananas	Banana Nursery	1.25 "
1VC		Miscellaneous	2.60 "
VA	Bananas	Botanist's Seedling var.	2.25 "
VB	Rotations	Strip Cropping	2.00 "
V1A	Rotations	Permanent Manurial Expt.	4.75 "
V1B	Rotations	Manurial Experiment	1.50 "
V1C	Citrus	Various Wind Breaks	2.00 "
V11A	Bananas	Proposed Liming Expt.	3.75 "
V11B	Miscellaneous	Nursery (Pear etc.)	1.60 "
V111A	Gane Nursery	Varieties	1.25 "
V111B	Grass	Varieties	1.50 "
1XA	Bananas	Spraying Fertiliser Expt.	10.75 "
1XB	Bananas	Liming Experiment	6.20 "
1XC	Bananas	Entomologist's Borer Expt.	4.45 "
X	Timber trees	Afforestation	1.25 "
Pastures	Guinea and other grasses		16.25 "
Odd areas	Sugar Cane; Morris Hall		10.00 "
	Woodland & Coconuts		19.25 "
Habitations -	Newton Farm House, Great House, Cottage		
	Hall House.		2.00 "
Roads & Tracks			4.40 "
Total			130.50 "

RAINFALL.

The following table shows the monthly rainfall for the years 1941 to 1944, together with the sixty year average up to 1941, obtained from the Public Works Department at Cambridge, which is some one and a half miles distant:-

1941- 1942	Rainy days.	1942- 1943	Rainy days.	1943- 1944	Rainy Days.	60 yr.av.	Rainy days.
2.63	9	14.83	14	6.15	11	7.13	19.7
4.56	9	13.17	22	8.43	18	13.30	15.3
14.47	19	8.20	21	9.42	15	9.97	12.6
7.95	13	8.59	21	9.69	16	9.59	12.7
12.12	21	14.80	21	11.44	22	11.05	15.1
10.14	19	5.44	16	14.07	20	12.29	16.1
10.44	16	10.00	20	12.55	15	12.42	17.0
7.50	9	0.56	6	3.85	7	5.53	11.0
2.70	4	4.68	9	1.38	3	2.25	6.9
5.30	11	1.98	3	.25	2	2.33	6.6
2.65	8	5.13	11	nil	-	3.23	6.8
10.06	12	4.45	9	1.78	6	4.77	8.5
90.52	150	91.80	173	79.01	135	93.87	139.3

From the foregoing table it will be noted that considerably less rain fell for the period April to June 1943, compared with the average for these months, though the distribution was spread over a greater number of days. From July to October, however, rainfall was above the average, with a corresponding increase in the total number of rainy days for this period. At the end of October a weather disturbance occurred, which caused no serious damage to permanent crops, though undercrops suffered considerably from the high winds and torrential down-pours experienced. Drought conditions set in in November and prevailed to the end of March. The year was not, therefore, a favourable one for crops generally on the Station.

GENERAL.

Work on the Station during the year comprised in the main part of a continuation of spraying, cultural, and manurial investigations with bananas, for which purpose the Station was originally leased under a grant from the Colonial Development Fund. In addition, soil erosion control work, rotation of crops with the incorporation of implements, observational and qualitative manurial experiments, with a variety of local and newly imported crops and grasses were conducted. An experimental Homesteading of some 7½ acres and a series of Matengo Pits were also established.

Panama Disease continued to make serious inroads into banana areas, with the result that certain lands had to be abandoned; other areas will be of little value for further experimentation with this crop in the near future.

The soil on the Station is derived mainly from Trappean shale and is typical of the area, since it occurs largely in the Parishes of St. James, Hanover and elsewhere. It is of a light loam in texture, especially porous on the hillsides and tends to be of a clayey nature in the glades; rocky outcrops of white and yellow limestone occur in certain sections. It is not in nitrogen content, extremely acid in reaction and deficient in lime and phosphate, but fairly rich in potash. The areas which have been previously cultivated, have lost the greater portion of their surface soil, owing to poor cultivation. The variation in the soils and the topography of the land are such that the proper layout of statistical experiments is rendered almost impossible; there is little doubt however, that valuable information is to be gained by means of simple experiments, and from investigations into the possibilities of mixed farming, which should materially, assist the Agricultural Development in the District.

Information relating to work carried out with various crops on different areas is as follows:-

BANANAS.

Field 1A - Area 1.25 acres. Banana Trashing Experiment.

The bananas were planted 10ft apart staggered on the contour in March 1942 and trenches given a fall of 1-100 with a vertical drop of 4ft for the first three trenches and 6ft for the lower trenches.

Cow Peas were interplanted during April and routine cultivation was carried out during the year.

Good control was obtained from heart leaf spraying up to September when Panama Disease appeared. Owing to heavy Ascospore infection leaf spot control was lost in October, after which two heart leaf spraying was resorted to in between the normal spraying cycle.

In April 1943 this area was set aside for the purpose of carrying out a small trashing experiment on behalf of the Leaf Spot Mycologist. The experiment started in May and terminated in September.

Field 111 - Area 5.25 acres. Proposed Cover Crop Experiment.

An area of $2\frac{1}{4}$ acres was planted with Gros Michel Bananas, spaced 11ft apart on the contour, in February, 1943. Drains were cut at a vertical drop of 6ft with a fall of 1-300.

Routine cultivations were carried out during the year. Intensive spraying with two heart leaf spraying in between three weekly cycles was resorted to from July to October in order to control Leaf Spot Disease. Investigations relating to the growing of various cover crops under bananas are to be conducted in this area; small supplies of seeds obtained for multiplication will be planted up on the individual beds, as soon as requirements are available.

Field 1VA - Area 2.00 acres. Lacatan Bananas.

This area was prepared in May 1943 for planting Lacatan Banana suckers for the purpose of carrying out a Fertiliser Experiment on behalf of the Agricultural Chemist. One thousand suckers were obtained and planted 11ft apart on the contour in June. Routine cultivations were carried out and normal three weekly spraying commenced in November. Owing to the uneven stand obtained, caused chiefly by borers, work in connection with fertiliser experiment was delayed, pending a more uniform establishment of the crop.

Field 1VB - Area 1.25 acres. Banana Nursery.

This area was established as a Nursery for Gros Michel Bananas. Routine cultivations and regular three weekly spraying cycles with Bordeaux mixture, were carried out during the year.

Field VA.- Area 2.25 acres. Botanist's Seedling Banana Trial.

This area was planted in 1941 with various seedling bananas, spaced 11'x11' on the contour, with level contour drains. The trial was continued and necessary records maintained on behalf of the Government Botanist, during the year under review.

Field V11A -Area 3.75 acres. Different Strength of Bordeaux Mixture Experiment.

Gros Michel Bananas were planted 10ft apart staggered and on the contour, in June 1941. This experiment was carried out for the Leaf Spot Mycologist, with the object of comparing the effect of different concentrations of Bordeaux mixture. The field was divided into two Randomised Blocks with the following four spraying treatments:-

- (1) 4-4-40
- (2) 3-4-40
- (3) 2-4-40
- (4) Control

The Leaf Spot Mycologist reports as follows:-

'The main effect of the treatments in this experiment proved difficult to analyse due to the extreme variability in the fertility of the soil in the different plots - a fact which was not appreciated at the time when the experiment was planned, but since has been shown to be related to the marked differential effect that certain soils have on the seasonal production of perithecia. Although none of the spraying treatments obtained anything approaching satisfactory control of ascospore infection (tip-spotting), it was interesting to note that the disease on the plot, with the least tip-spotting and consequently the one most subject to conidial infection, was effectively controlled by 3 weekly cycles of a 2-4-40 Bordeaux mixture.'

At the termination of this experiment late in 1942, a fertiliser experiment with lime, artificials, and pen manure was proposed, but this had to be abandoned, owing to the inroads of Panama Disease.

Field 1XA.-Area 10.75 Acres. Spraying Fertiliser Experiment.
Field 1XB.-Area 6.20 acres. Lining Experiment.

The results of these Experiments have been reported on separately by Mr. Leach, Leaf Spot Mycologist.

Field 1XC.-Area 4.45 acres. Entomologist's Borer Experiment.

This area was prepared and planted on the contour with barrier grasses in November 1943, for the Government Entomologist with the view to carrying out field trials to test the relative susceptibility of varieties of plantains and bananas to the borer weevil. The following varieties were planted:-

<u>Varieties.</u>	<u>Number.</u>	<u>Date planted.</u>
Gros Michel	100	1.11.43
S 19.	74	1.11.43
Maiden & Hoarse Plantains	93	1.11.43
Giant Plantains	99	19.11.43
Cavendish	119	7.11.43
Lacatan	100	15.12.43
White House	66	26.1.44
S.A.1.	30	29.1.44

Routine work was carried out. Severe drought conditions experienced from November to March considerably retarded the growth of plants.

HOMESTEADING.

Field 1B. - Area 7.75 acres.

This area was set aside for the purpose of establishing an Experimental Homesteading in 1942, following a paper read by Mr. W.K. Mitchell, then Assistant Agricultural Officer, Newton Farm, entitled "Peasant Homesteading in Jamaica", at the Agricultural Instructors' Conference.

The main objects of the holding are to obtain information as to the yields and income which might be expected from food fodder and export crops, by a small holder operating efficiently, to determine suitable rotations and proportions of food crops necessary, to obtain experience in operating a small holding, and to determine the size of the holding which is necessary to enable a small farmer to obtain a reasonable income.

The farming in the vicinity of Newton Farm Agricultural Station consists in the main part of small holdings of various sizes, on which mixed cropping is practised and a few large banana properties, which provide the peasant with either casual, or regular labour. The Countryside is of a hilly nature and appears to be well suited to peasant farming. The District falls into the 100" rainfall belt; extremely humid conditions are experienced during the months of April to November, which tends to limit the range of small crops produced during these months, while conditions are generally too dry for production of short season crops from December to March. The soil in the area is derived from Trappean shale and is not only acid, but deficient in phosphate and lime and also low in nitrogen. It is also susceptible to erosion. The problem with which the Homesteader is faced, is therefore no easy one. The first matter requiring attention is that of soil erosion control, which requires time and expenditure, if he has the requisite funds. The building up of the fertility of the land calls for the application of manures - the purchase of which are beyond his reach, otherwise the growing of green manure crops, or the keeping of livestock; of these the latter is the most practicable proposition. In

the event of such a Homestead as that envisaged being a success in practise, the question of financial assistance for capital development would require consideration. In order to study the economics of the establishment of a Homesteading on the lines proposed, it would have been desirable for the different stages of development to proceed for record purposes, step by step, over a period of years, as would be the case in actual practise, but since such a procedure would take a relatively long period, the desirability of obtaining early information on numerous factors has necessitated the process of development being accelerated, thus causing information relating to costs and methods of establishment to be sacrificed. Any change over from the present system of farming in the area, should however, not prove unsurmountable.

The first steps taken with the area set aside for the experimental Homesteading after the necessary clearing and planting of contour grass barriers had been completed, was that of establishing observation plots with a variety of root, legume, grasses and miscellaneous fruit and vegetable crops, on which the effects of fertilisers and lime were tested out. Although results with food crops have been so far disappointing, due to the low state of fertility of the land, Guatemala, Guinea and Elephant grasses, proved easy to establish and have continued to thrive. Detail records of weights and yields of the various crops and grasses grown are being maintained. The incorporation of livestock and the production of manure for application to the land will materially assist in building up the fertility of the soil and lead to an improvement of crop yields.

The completion of a cow shed, to accommodate five stall fed cows, calf and mule pens, feed and milk rooms and a storage loft, made with local hardwood, which is situated in the centre of the Homestead, took place during the year; a hand pump for supplying water to a trough in a corner of the small paddock adjoining the cowshed, was also installed. Three heifers obtained from Grove Place Agricultural Centre in September, readily took to stall feeding with the fodder grasses grown on the holding. The quantity of fodder fed daily is recorded against the plot from which it is cut, while the manure produced is collected, weighed and stored in a small shed adjoining the cowshed, pending application to the land.

A donkey purchased in November has proved very useful for transporting fodder and manure to and from the various plots. A Berkshire Sow was purchased and sent to Knockalva Livestock Improvement Centre for service in January. This animal occupies a pig pen which is divided into four sections, the fencing of which is made of bamboo posts cut on the Station. The pig sty is situated in the centre of the pen in order that each section may be used in rotation, thus preventing the possibilities of the spread of any disease. A poultry run has also been built, in which it is proposed to maintain birds of the Rhode Island or White Leghorn Breed, as a further source of revenue.

A small Orchard in which a variety of fruit and economic trees, such as Oranges, Limes, Breadfruit, Ackee and Naseberry and also other backyard or undercrops, which are to be found in the majority of holdings in the districts, is being established on the vicinity of the poultry and pig pens.

A systematic rotation of crops is being followed out with the crops grown on the different beds, while implemental tillage is also being resorted to whenever this is practicable.

Field 1C - Area 4.00 acres. Peasants' Cultivation.

This area is situated on a steep hillside adjoining the Homesteading area. The land was contoured and established in grass barrier strips; Khus Khus grass has proved a most satisfactory barrier grass. The individual beds have stood up well to the heavy falls of rain experienced during the year and practically no soil erosion resulted. Various rotations are being carried out in the different beds or terraces according to gain. Marked increases in yield have been obtained from ginger and peanuts, following the application of lime at the rate of ten tons per acre. It seems doubtful, however, whether such a heavy dressing will be an economic one, in view of the high cost of lime, but it is too early to come to any definite conclusions. Detailed records of costs and yields are being kept.

Field 11A - Area 2.00 acres. Matengo System.

This ingenious system of cultivation for steep slopes has proved effective in preventing soil erosion over a period of continuing cropping for the past half century at least, in the Matengo Highlands, East Africa, and is being tested out on the lines of a note on the subject entitled "Agriculture in the Matengo Highlands", by Mr. A. S. Stanhouse, Agricultural Officer, Tanganyika Territory.

The area of land selected for the purpose, is situated on a steep highly eroded slope in a low state of fertility, which was of little or no use for cultivation, while normal methods of soil conservation, such as trenches and contour grass barriers would have been of little value. The first step taken was that of cutting the grass cover and laying it in rows forming a grid; one set of rows followed the contour and the other was set at right angles to it. The soil in the squares thus formed was then dug out until the subsoil was exposed on the centre of each square or pit. Viewed from a distance the crossing of the rows of grass with the squares of soil in between, gives a 'chess board' effect. Owing to the steepness and shallow nature of the surface soil and the variation of the slope of the land, the area was divided into three sections, with the object of testing out the relative value of different sized pits. Those measuring 10'x10' were placed on the area having the least slope, while others measuring 7'x7' were placed on the intermediate area and the remainder measuring 5'x5' were placed on the very steep slope.

Three different rotations were decided upon for each section, (A) single cropping (b) mixed cropping (c) alternative rotations. Fall planting was possible only in the case of the 10'x10' pits, which were lined at the rate of seven tons per acre. Unfortunately dry weather conditions prevailed, resulting in low yields.

Field 11B - Area 2.50 acres. Cassava Varieties.

This area is steep and was contoured and trenched with beds having 3' and 4' vertical falls. A trial was made with six different varieties of grasses as trench bank consolidators. Observations have proved Khus Khus to be the most suitable barrier grass. Different varieties of cassava were planted and received nursery culture, in order to propagate for maximum distribution. Small cuttings were periodically removed from the plots for propagation elsewhere.

Variety	Area	Weight	Yield per acre.
Blue Top	1110 sq. ft.	76 lbs.	1 1/3 tons.
Black Stick	1126 " "	90 "	1 1/8 "
White Stick	1068 " "	124 "	2 1/2 "
Brown Stick	1744 " "	117 "	1 1/3 "
Bunch of Keys	1026 " "	56 "	1 1/14 "
Gordon	945 " "	49 "	1 ton.

Field 11C - Area 5.75 acres. C.D.O. Miscellaneous Crops.

This area was cleaned and contoured in March 1943, for Mung Bean and Cow Pea Variety trials for the Crop Development Officer. Lime was applied at the rate of five tons per acre to the Mung Bean area and to two of the Blocks under Cow Peas, at the rate of seven tons per acre.

The Mung Bean trial was divided into five Blocks, each block was subdivided into seven $1/40$ acre plots, representing one of the seven varieties in the trial.

In the case of the Cow Pea Trial six blocks were subdivided into five plots, each also representing one of the five varieties in the trial. Yields obtained were as follows:-

Mung Bean Variety Trial.

Varieties.	Plot area.	Yield Obtained.	Yield p.a.	Rate lined.	Rain-fall.
A.C.B. 23	$\frac{1}{4}$ acre	33 quarts	8 $\frac{1}{2}$ bushels	5t.p.a.	41.75"
A.C.B. 67	" "	13 "	3 $\frac{1}{2}$ "	5t.p.a.	41.75"
A.C.B. 238	" "	11 "	2 $\frac{1}{2}$ "	5t.p.a.	41.75"
A.C.B. 292	" "	17 "	4 $\frac{1}{2}$ "	5t.p.a.	41.75"
A.C.B. 345	" "	24 "	6 "	5t.p.a.	41.75"
A.C.B. 420	" "	11 "	2 $\frac{1}{2}$ "	5t.p.a.	62.30"
A.C.B. 345	" "	10 "	2 $\frac{1}{2}$ "	5t.p.a.	41.75"

Cow Pea Variety Trial - Unlined.

Varieties.	Plot area.	Yield obtained.	Yield p.a.	Rate lined.	Rain-fall.
A.C.B. 14	$1/10$ acre.	30 quarts	9 $\frac{1}{2}$ bushels	nil	33.84"
A.C.B. 387	" "	26 "	8 $\frac{1}{2}$ "	"	" "
A.C.B. 64	" "	18 "	5 $\frac{1}{2}$ "	"	" "
A.C.B. 293	" "	25 "	7 $\frac{13}{16}$ "	"	" "
A.C.B. 10	" "	28 "	8 $\frac{1}{2}$ "	"	" "

Cow Pea Variety Trial - Lined.

Varieties.	Plot area.	Yield obtained.	Yield p.a.	Rate lined.	Rain-fall.
A.C.B. 14	$1/20$ acre	24 quarts	15 bushels	7 t.p.a.	33.84"
A.C.B. 387	" "	20 "	12 $\frac{1}{2}$ "	7 t.p.a.	" "
A.C.B. 64	" "	12 "	7 $\frac{1}{2}$ "	7 t.p.a.	" "
A.C.B. 293	" "	24 "	15 "	7 t.p.a.	" "
A.C.B. 10	" "	16 "	10 "	7 t.p.a.	" "

Field 1VC- Area 2.50 acres. Miscellaneous.

This area was contoured and planted with Elephant Grass barriers; trials with Derris and other miscellaneous crops are proposed.

Field VI- Area 2.00 acres. Strip Cropping.

This area is divided into different sized contour strips of varying widths:-in the case of narrow strips from 5 to 15', medium strips from 15' to 25' and wide strips from 25' to 40'. The object of the experiment is to ascertain the amount of soil wash through the adjacent fallow strips with or without trenches; it will also serve a useful comparison with the Matengo system. The strips were planted with Spring Crops in April 1944. Present indications are that narrow beds are not only difficult to lay out, but are more liable to suffer from the effect of shade, while sheet erosion is more pronounced on the wide strips. This trial will have to be continued for several years before any definite conclusions are reached.

Field V1A - Area 4.75 acres. Chemist's Manurial Experiment.

A combined mulching - fertiliser experiment with Bananas, was started in October 1941 on this land, which was originally in derelict bananas, suffering from lack of moisture and soil erosion. The experiment had to be abandoned in May 1943, owing to the effects of Panama Disease, following which a separate report summarising the results obtained, was submitted. This area has since been laid out and prepared for a permanent manurial experiment on annual crops with farm yard manure and artificial fertilisers, on behalf of the Agricultural Chemist. A Uniformity trial with J.S.Y. Corn is at present being conducted. Fly penning is also in progress in order that the necessary requirements of farm yard manure will be available when the experiment starts. Soil samples have been taken from individual plots for analysis, in order to determine the lime requirements of individual plots.

Field V1B -Area 1.50 acres. Manurial Experiment.

Area set aside for the purpose of carrying out Fertiliser Experiments with Food Crops on behalf of the Crop Development Officer.

Field V1C -,Area 2.00 acres. Citrus.

This hillside area, planted with fifty budded trees of the following varieties of Citrus: Tahiti Lime, Rough Lemon, Ortanique, Kumquat, Shaddock, Marsh Seedless, Cecily, Thompson Pink, Silver Cluster, Valencia, Hamilton, Parson Brown, Tangelo, Lamb's Summer, and Surprise Navel, as a source of Budwood supply, was platform terraced and interplanted with various types of windbreak - Tephrosia candida, Bananas, Glinicidia maculata and Guatemala Grass - to test their relative merits. A small nursery for the distribution of budded citrus has been established. Quantities of Tephrosia candida seeds were distributed to citrus growers to be interplanted in their citrus groves as a means of controlling 'Fiddler Beetle'.

COCONUTS. Six young plants affected with Bronze Leaf Wilt were obtained from a coast property in St. James and transplanted for observation purposes on behalf of the Government Mycologist. The coconuts growing in pasture lands maintained a healthy condition: individual tree recording continued.

Field V11B - Area 1.60 acres. Nursery (Pears etc.)

This area was originally intended for growing vegetables, but owing to the difficulty of controlling Para and Bahama grasses, this idea was abandoned and it has since been used for multiplying Napier and Saccharum grasses, Bengal Bean, Adlay and other miscellaneous crops. Three beds were planted with Sansevieria, but growth has been very disappointing. Twenty One Avocado Pear Plants of the following varieties were planted during the year:- Lula, Winslowson, Collinson, Prince, Dutton, Collinred, Feurte, Simmonds, Pollock, Eagle Rock, Trapp, Linda, and Dickenson, for observation purposes and as a supply of budwood for surrounding Districts.

Field V111A - Area 1.25 acres. Cane Nursery.

The following resistant varieties of cane are planted in this area for distribution to small farmers in the District:- FC 916, PR 803, B 34109, B 35204, B 3439, M 28, POJ2878, Co 281. The demand for tops has been very disappointing.

Field V111B- Area 1.50 acres. Grass Varieties.

Guatemala - Excellent fodder grass, but no good as a barrier.
Elephant - Good for both barrier and fodder purposes.
Napier - " " " " " " "
Khus Khus - Excellent barrier grass
Lemon Grass-No good as barrier, but useful border grass.
Guinea (Cow or St. Mary Grass) good fodder grass, -promising as barrier.

Saccharum ciliare - Further trial necessary.
Melasses - Good fodder grass, but difficult to establish.
Swaziland Finger - Promising grass for grazing purposes.
Rhodes, Lallia, Beard Grasses - Not outstanding, have withstood drought conditions well.
Panicum coloratum - Has possibilities as pasture grass.
Latul Red Top, and Kikuyu - Not outstanding - unlikely to be of value for either pasture or fodder purposes. Stand up well to dry weather conditions.

Field X - Area 1.25 acres. Afforestation.

This area was planted with Mahoe during 1942. During the year strips of Guatemala and Elephant grasses were inter-planted for multiplication purposes, also to encourage the growth of the Mahoe seedlings.

SOIL CONSERVATION.

The total area which has been established on experimental areas and otherwise, in contour grass barriers, terraces and strip cropping cultivation, including the area especially set aside for Matengo Pits, amounts to 77 acres. Work on a series of Run-Off Plots on a steep portion of Field 11A continued. The merits of different types of ploughs for hillside cultivation are being tested.

MINOR & NEWLY INTRODUCED CROPS.

Observations on the following crops were carried out during the year:-

Fibres. Sansevieria. Slow growth - disappointing. Exacting in soil requirements.

Urena lobata. Appears to grow better wild, than cultivated. Exacting in soil requirements.

Pulse. Mung Bean. Grow well-respond to application of lime and phosphate.

Cow Peas " " " " " " " "

Soya Bean " " " " " " " "

Ground Nuts " " " " " " " "

Jerusalem Pea " " " " " " " "

Bonavist " " " " " " " "

Black Eye Pea " " " " " " " "

Cover Crops Canavalia (ensiformis, plagiosperma, gladiata) grow well.

Edua Pea. Excellent cover crop.

Bengal Bean " " " "

Somerset Velvet Bean. Excellent Cover Crop.

Indigofera. Slow growth.

Calopogonium. Difficult to establish.

Tephrosia candida. Grows well - useful for interplanting in Citrus for control of fiddler beetle.

Grains. Adlay. Grows well, especially under moist conditions.

Hill Rice. Unlikely to be of economic value locally, due to poor yield, but worth further investigations.

Swamp Rice. Yield poor - disease.

Sunflower. Somewhat exacting in soil requirements.

Special Economic Crops. Derris
 Growth slow, especially D. elliptica. Field trials to be conducted.

Cryptostegia. All plants being tried out on different soils show slow growth.

Lookings. Single observation plant grew and yielded well.

Castor Plant. Somewhat exacting in soil conditions.

Vanilla. Growth slow. Vanillery has been started.

Stramonium. Failure.

Sesame. Promising.

<u>Roots.</u>	<u>Sweet Potatoes.</u>	Grow well
	<u>Yams.</u>	" "
	<u>Baddoes</u>	" "
	<u>Finger</u>	Promising - responds to lime.
	<u>Cassava</u>	Yields poor so far.
	<u>Irish Potatoes</u>	Altitude too low.

<u>Vegetables.</u>	<u>Turnips</u>	} Grown well when given proper attention, but difficult to dispose of.
	<u>Cabbages</u>	
	<u>Tomatoes</u>	
	<u>Carrots</u>	

DISTRIBUTION OF PLANTS, ETC.

The following were distributed during the year:-

Guatemala Grass	52	bags
Elephant "	29	"
Lemon "	8	" + 2½ cwt.
Finger "	5	"
Napier "	3	"
Dallis "	2	"
Rhodes "	6	"
Molasses "	7	"

There has been an increasing demand for supplies of Elephant and Guatemala grasses, for soil conservation and fodder purposes.

Cane Varieties	20	"
<u>Saccharum ciliare</u>	10	roots

Ornamental Plants	15	
Potato Slips	10	bags
Mahoe Plants	300	"

Rice A.C.R. 48	1	lb.
Sunflower	1	"
Adlay	1	"
Newly introduced crops	54	lbs.
Cow Peas	14	"

LIVESTOCK.

An additional two mules were purchased during the year, bringing the total up to six. These animals are used for draft and ploughing purposes. Five New Zealand Red Rabbits were obtained from Hope, the progeny of which will be used for distribution to Livestock Improvement Centres in the Division. Three Heifers were obtained from Grove Place, also a Berkshire sow and a donkey were purchased for the Homesteading.

METEOROLOGICAL OBSERVATIONS.

Daily rainfall records are kept at Newton Farm (Friez Gauge) and at Cottage Hall (Standard Gauge). Maximum and minimum temperatures are recorded at Newton Farm by means of Thermohygraph.

AGRICULTURAL EDUCATION.

Agricultural Instructors.

Three probationary Agricultural Instructors were appointed to undergo training at the Station in September 1943. Facilities were afforded these Instructors to studying the general activities of the Farm, by spending a definite period in each section. They were also enabled to visit Irwin and Haughton Court Agricultural Centres, Knockalva Practical Training Centre and the West Indies Sugar Company, Factory and Estates, at Frome, Westmoreland.

VISITORS.

A total of four hundred and eleven visitors was recorded during the year, including Nominated Members of the Legislative Council, Custodes of the Parishes of St. James and Hanover, Members of the Board of Management, Representatives of the Jamaica Agricultural Society, Bankers, Banana Growers, Farmers, also Students of the Knockalva Practical Training Centre and Cornwall College.

LIBRARY.

A small Library was started during the year.

MANIC FARM COMMITTEE.

One visit was paid to the Station by the three members of the Committee during the year.

EXTENSION WORK.

The Banana Experiments at Seven Rivers, St. James and Kenilworth, Hanover, terminated during the year. The results of these experiments are being prepared separately.

The Banana Manurial Experiment (Qualitative) started at Bucketts Property on plant bananas in June 1942, continued.

STAFF.

W.K. Mitchell, Assistant Agricultural Officer - Sick Leave 1/6/43-31/6/43, 1/7/43 to 5/7/43. Transferred to Grove Place 1/8/43.

S.O. Coy appointed Junior Agricultural Officer, Grade 11, 1/10/43. Vacation Leave 17/1/44 to 31/3/44.

A.R. King - Appointed Field Foreman 1/4/43. Departmental Leave 29/1/43 to 30/1/44, 2/2/44 to 5/2/44.

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2.3.1.1.

In 1943-44 the work of the station was considerably extended and before the end of the period under review the entire available area was occupied by experiments on crops. As a result consideration of space became a limiting factor in the planning of field investigations. Possible expansion as a unit is restricted owing to the geographical position of the station, but negotiations were commenced with a view to its enlargement by the acquisition of additional land from neighbouring estates.

The uncertainty in this connection made it advisable to defer erection of livestock buildings until the most suitable sites can be selected in relation to the ultimate limits of the station. In consequence the only animals maintained were three mules used to draw small agricultural implements and two horses for riding purposes.

2.3.1.2.

The total rainfall was appreciably lower than the average for 20 years. There was a sharp drought in June and July following unusually heavy rains in April and May. In December, too, the rainfall recorded was abnormally high though the autumn rainy season was mild in comparison with other years. In the following table details of precipitation according to each month are given:

Month.....



Month	Total ins.		No of rainy days	Highest fall 24 hours ins.
	1943-44	Av. 24 yr.		
April 1943	9.64	6.06	19	2.52
May	15.34	9.75	20	3.26
June	2.87	4.92	11	1.06
July	0.85	3.17	6	0.28
Aug.	3.42	5.21	10	1.75
Sept.	2.18	6.19	9	0.86
Oct.	3.95	8.27	21	2.02
Nov.	4.75	14.28	24	2.76
Dec.	11.76	9.60	23	2.33
Jan. 1944	8.60	5.53	18	1.94
Feb.	0.46	4.49	11	0.11
March	1.30	4.25	9	0.50
Total	70.12	31.69	181	-

Additional meteorological instruments were acquired at the end of 1943 and systematic recording of temperature and humidity as well as rainfall was started. The figures for three months in 1944 are set out:

Month	Means Temp.			Extreme Temp			Mean Hu- dity	
	Max.	Min.	7 am 3pm	Max.	Min.	7 am 3pm	7 am 3pm	7 am 3pm
Jan. 1944	80.20°F	64.1	66.30°F	78.0	84.0	58.0°F	96	75
Feb.	81.3	62.4	66.9	79.1	84	56	97	80
March	84.8	61.2	66.3	83.3	88.3	57	94	55

SECTION 11. SUB-HEAD 1.

Bananas.

As in previous years banana was the main crop on which investigations were concentrated. The majority of the experiments undertaken have been of a fundamental nature though the results of some are likely to be of peculiar local importance.

Resistant Variety.

The area under seedling varieties immune and highly resistant to Panama Disease was extended on behalf of the Botanist; over 13 acres were occupied by the end of the year. These seedling plots have been maintained for the dual purpose of obtaining data on the fruit and balking those which give indications of commercial possibilities. A number of useless varieties was discarded while 1500 seeders of others exhibiting desirable potentialities were produced for variety trials.

Field Experiments.

The Fertilizer -Mulch experiments laid down with Lacatan and Cavendish banana in the Spring of 1943 were continued. In both cases there are five randomised blocks of eight plots each and the main treatments are as follows:

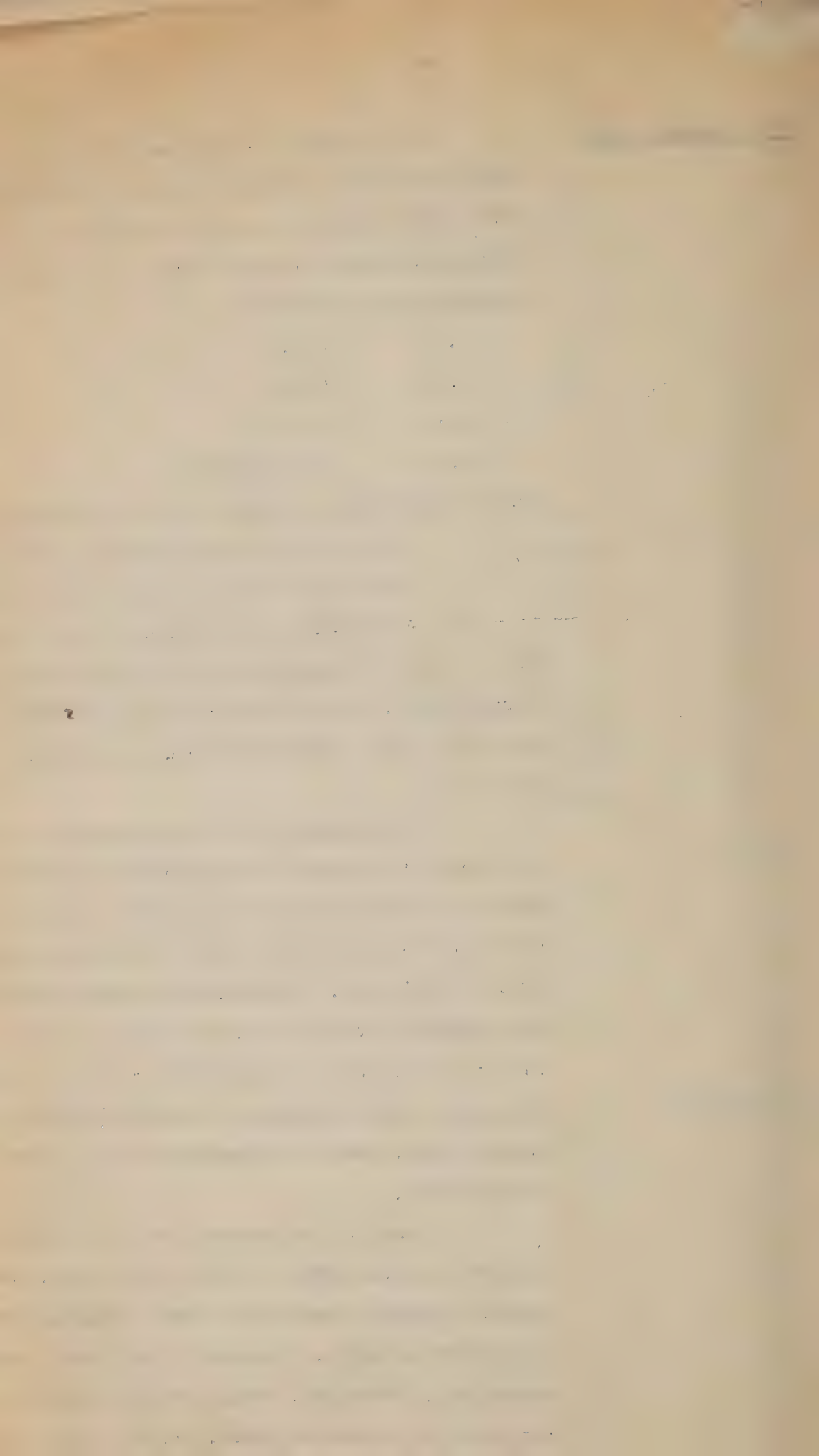
- | | |
|--------|----------------|
| 1. N | 5 N.K |
| 2. P | 6 P X |
| 3. K | 7 N PK |
| 4. N P | 8.0 (Control). |

Where N represents an application of approximately 9 cwt of nitrate of soda per acre per annum
 P 4 cwt triple super per acre per annum and
 K 4 cwt Muriate of potash per acre per annum.
 The Nitrate is applied monthly and the others every three months. Half of each plot receives mulch at the rate of 12 tons per acre per annum, applied every six months.

The objects of the experiments are to determine the effects of fertilizer and mulch treatments on storage and eating qualities of the fruit as well as yields and to study the residual effects of the treatments. Accordingly maximum dressings are applied to ensure that an excess of each constituent is available and applications are to be discontinued after 18 months. The observations on growth rates, bunch and fruit characteristics will be continued.

Early in the growing season attacks by banana borer and the effect of very dry weather made extensive spraying necessary with a resulting check in uniformity of stand. Reaping of the plant crop commenced in February, 1944, but some plants had not shot at the end of March. Yield figures up to that time are set out below:

(Over)



Treatment	Lacatan				Cavendish			
	Mulched		Not Mulched		Mulched		Not Mulched	
	Stems	Counts	Stems	Counts	Stems	Counts	Stems	Counts
O	14	6 $\frac{1}{2}$	10	5 $\frac{1}{2}$	11	8	18	11
N	23	12	8	5 $\frac{1}{2}$	24	17 $\frac{1}{2}$	8	6
P	16	9 $\frac{1}{2}$	8	3 $\frac{1}{2}$	7	5	9	5
K	25	17 $\frac{1}{2}$	9	5 $\frac{1}{2}$	21	16 $\frac{1}{2}$	14	10
NP	30	14 $\frac{1}{2}$	19	10	37	30	25	7 $\frac{1}{2}$
NK	21	12 $\frac{1}{2}$	30	16 $\frac{1}{2}$	33	27 $\frac{1}{2}$	11	6 $\frac{1}{2}$
PK	18	10 $\frac{1}{2}$	12	6 $\frac{1}{2}$	20	15 $\frac{1}{2}$	19	11
NPK	38	20 $\frac{1}{2}$	7	4 $\frac{1}{2}$	38	27 $\frac{1}{2}$	39	25 $\frac{1}{2}$
	185	103 $\frac{1}{2}$	105	57 $\frac{1}{2}$	191	148	143	94 $\frac{1}{2}$

Standard banana practice was adopted as regards cultivation, pruning, and spraying. In the late autumn of 1943, nevertheless, severe burning occurred on the leaves of a great number of plants, particularly the Cavendish and the effects could be noted on the ripening of the first stems. It was not practicable to carry out the originally proposed cold storage tests on these and they were ripened under observation at room temperature which ranged between 70°F and 85°F on the average.

Records were continued in the Gros Michel defoliation experiment in spite of the inroads of Panama Disease which has increased the number of gaps from 20 in March 1943 to 107 in 1944. Defoliation treatments were maintained with parent plants and followers alike as follows:

1. No. defoliation
2. Limiting plants to 12 open leaves.
3. " " " 10 " "
4. " " " 8 " "
5. " " " 6 " "

and each treatment was divided into four according to the time in the life of the plant when it was first applied.

- (a) From the very beginning at planting
- (b) " 4th month
- (c) " 6th month
- (d) " 8th month.

The main.....

The main treatments are randomised over 4 blocks and sub-treatments randomised within each plot. No guard rows are allowed and demarcation is by means of rows of lemon grass between the sub-plots of 12 plants each.

Standard pruning, cultivation and spraying were followed and in addition fertilizer was applied at the ^{following} rates to each stool:-

$\frac{1}{2}$ lb triple super every 6 months

$\frac{1}{2}$ " Muriate of Potash " " "

2 ozs Nitrate of Soda every month.

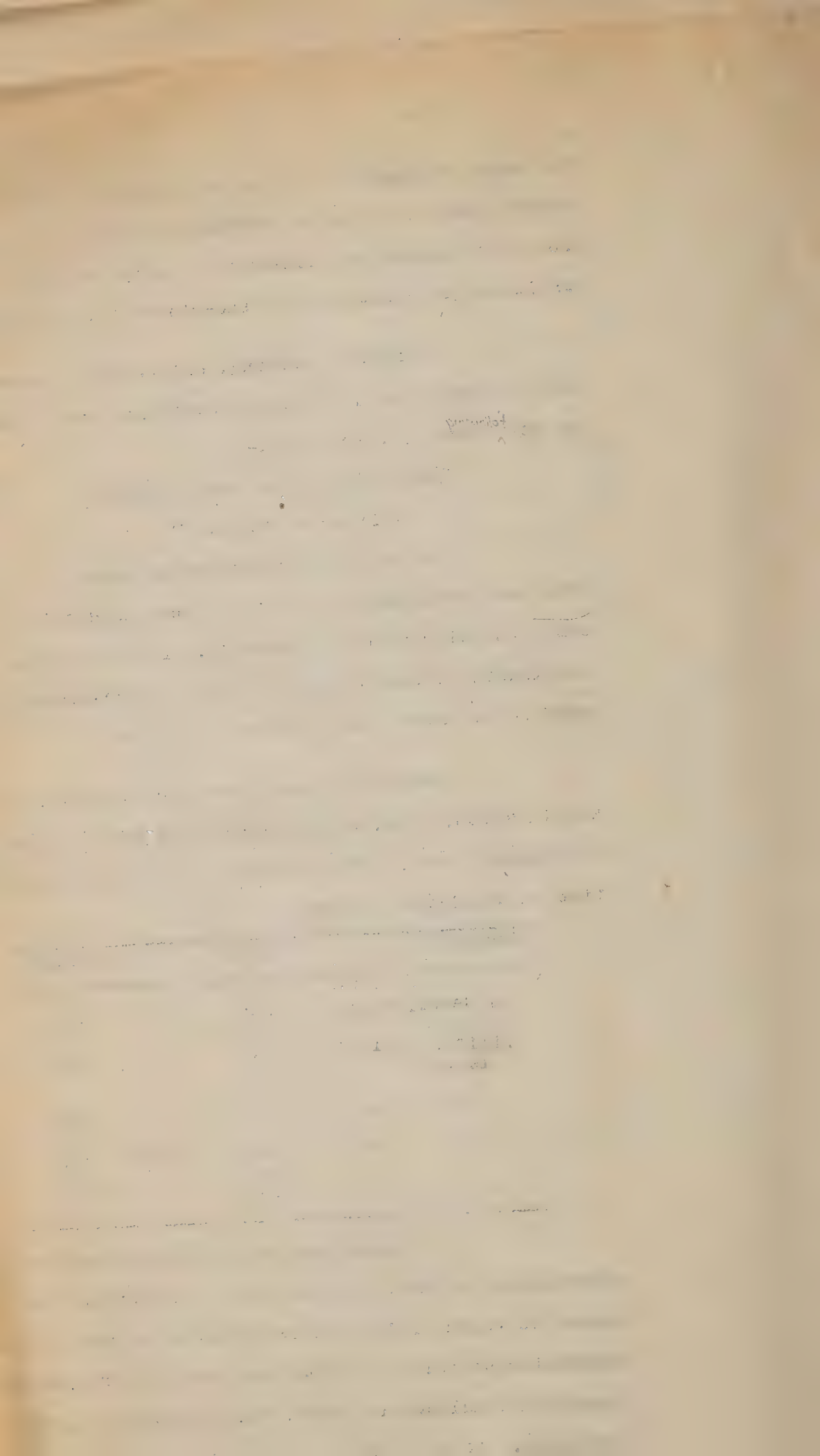
Data were recorded as to rate of leaf production, rate of elongation of the pseudostem, time of shooting and length of time taken to mature, and measurements made of the bunch and individual fingers.

Reaping of the plant crop was still under way in March, 1944, though several of the followers had already shot. The production of fruit up to that time is tabulated below:

Treatment	Stems	Counts
No defoliation	56	37 $\frac{1}{2}$
Limited to 12 $\frac{1}{2}$ leaves	59	36 $\frac{1}{2}$
" 10	55	34 $\frac{1}{2}$
" 8	72	35 $\frac{1}{2}$
" 6	48	21 $\frac{1}{2}$

A pruning experiment with Gros Michel was established in the spring of 1943 to determine the extent to which yields can be affected by rapidity of succession of followers both when bananas are heavily manured and mulched and when they receive no special treatment. It was laid out in four randomised blocks of plots each consisting of 30 plants and the following were the experimental treatments:-

1 Pruning.



1	Pruning to allow a single follower every 8mth	
2.	" " " " " "	6mth
3.	" " " " " "	4mth
4.	" " " " " "	" "
5.	" " a double follower every	8 "
6.	" " " " " " " "	4"

One half of each plot is mulched twice a year with 30 lb. of dry grass per stool at each application and fertilized with:

3 ozs. Nitrate Soda per stool per month

$\frac{1}{2}$ lb. triple super " " every 3 months

$\frac{1}{4}$ Lb Muriate of potash " " " "

Some difficulty was experienced in getting suitable double suckers to develop at the right time in several stools and single suckers were left at first, invariably however a second sucker was produced after two or three weeks. The thickness of some mats rendered spraying laborious and effective control of leafspot was obtained at considerably greater trouble than with normal banana fields. Banana Disease, too, affected the experiment and the population of a number of plots were reduced to 50% of their original strength by March, ¹⁹⁴⁴ when reaping of the plant crop was commenced. Fruit cut were as follows:

Succession of Followers - Mulched & Fertilized. Control									
Single follower every 8 mth	- sts	- sts	1 stg	2.1s.	3.1s.	4.1s.	5.1s.	6.1s.	7.1s.
" " " 3 "	3	2	3	4	5	6	7		
" " " 4 "	3	2	5	4	6	7			
" " " 2 "	1	1	5	3	6	4	3		
Double followers " 8 "	2	1	2	2	4	3			
" " " 4 "	3	2	6	4	3	7			
Total									

As the original spacing trial with Gros Michel in 1942 had failed through the effects of Panama Disease a new trial was planted in Spring of 1944 with Lacatan which are immune to the disease and produced plants approximating Gros Michel in size. The experiment was designed to determine the influence of density of population on yield under ordinary conditions and also with heavy manuring and mulching.

The treatments have been arranged in 4 randomised blocks and are as follows:-

- 1 spacing 11'x 11'
2. " 10'x 10'
- 3 " 9'x 9'
4. " 8'x 8'.

Lining was done on the contour and according to a hexagonal layout.

Half of each plot receives mulch and fertilizer at the rates stated below:

Mulch - 1- tons freshly cut elephant grass per acre every 6 months.

Fertilizer 8 cwt. Nitrate of soda per acre per annum in monthly application

8 cwt. Super(18%) per acre per annum in quarterly application

3 cwt. Muriate of Potash per acre per annum in quarterly application.

At least two discard rows are maintained around each plot of 0.05 acre in extent in order to obviate edge effects.

Records of growth and yields will be kept.

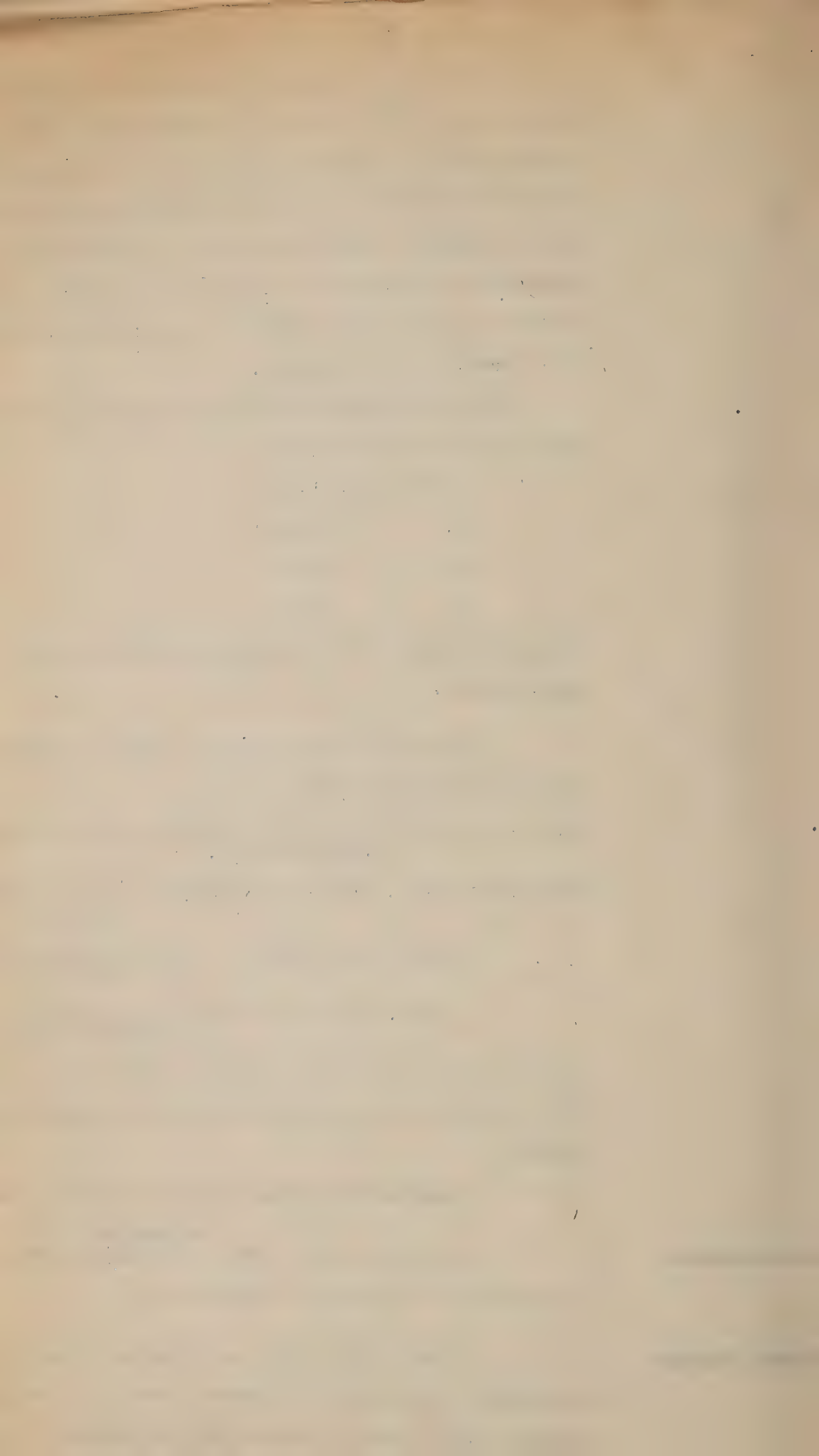
variety of

S.A.1 Bananas. A small plot of the S.A.1/Bananas was planted in the spring of 1944 for observation.

Leafspot Disease.

Observations were continued on areas sprayed according to recommended standard practice although spraying trials were completed in the previous year.

On One.....



On one section where the Soil reaction was neutral perfect control was obtained throughout autumn and winter without any spraying after September, 1943, but heavy ascospore infection occurred on Lacatan, Cavendish and Gros Michel in other areas of the Station where the soil was slightly acid. Nearly all the seedling varieties exhibited a high degree of resistance and spotting was always confined to older leaves, there were at least eight free of spots.

Banana Borers.

Four varieties of Plantain - Giant, Maiden, Horse and Whitehouse, and four banana, Gros Michel, Lacatan, Cavendish, S.19 were planted out in a nursery in the autumn of 1943 to provide material for the Entomologist to carry out investigations on varietal susceptibility to attack by borer - Metamasium hemipterus. At the end of three months the population of plantain suckers was considerably reduced though the bananas were hardly affected, after 6 months this effect was even more noticeable.

Variety	No. Planted	Killed by borer		Survival	
		3 months	6 mths	3 mths	6 mths
Giant Plantain	92	30	87	65.2	8.2
Maiden "	100	36	92	64.0	8.0
Horse "	100	49	84	51.0	16.0
Whitehorse "	100	10	68	90.0	32.0
Gros Michel banana	131	3	11	97.7	91.6
Lacatan "	200	-	30	100.0	70.0
Cavendish "	210	-	16	100.0	76.4
S.19 "	109	-	14	100.0	87.2

Panama Disease.

All sections of the station are infected with Panama Disease to an extent which makes it impracticable to carry out further large scale field experiments with Gros Michel bananas. However, an experiment was laid down in March, 1944, to determine to what extent the claim of certain soil-inhabiting actinomycete to an inhibitory effect

effect on the growth of the Panama Disease fungus- Fusarium oxysporum cubense may hold good and how this may be applied in the replanting of diseased land, The experimental treatments aimed at multiplying and maintaining very large numbers of actinomycetes in the vicinity of the banana roots where they ^{may}/readily exert their beneficial effect by attacking the Panama Disease organism.

The treatments arranged in randomised blocks are as follows:-

- (1) Control - normal banana practice
- (2) Application of mulch to the whole two months before the sucker is planted and thereafter every two months from the time of planting. Ten lbs of green khus-khus make up the standard quantity per plant.
- (3) Inoculation of the sucker with actinomycetes known to be antagonistic to the P.D. fungus. A suspension of spores is sprinkled in the hole and on the sucker at planting.
- (4) Mulching at the time of planting and at the same time inoculation with actinomycetes isolated from samples collected in the same field. The suspension of spores is sprinkled on the mulch as well as on the sucker.
- (5) Mulching at planting and inoculation with actinomycetes known to be antagonistic to the P. D. fungus.

A close observation is being made for the first appearance of Panama Disease.

MAIZE.

Work on this crop was limited to multiplication of selected varieties Mx J S Y and Mx L X J S Y on behalf of the Botanist, multiplication of sweet corn and the use of the variety JSY as indicator crop

in fertilizer experiments. Though the area is not regarded as suitable for corn relatively high yields were obtained - 19.5 bushels per acre from the spring crop.

25.5 bushels per acre from the autumn crop.

Hill Rice.

Very poor yields were obtained from six varieties of hill rice sown in September, 1943, the average being 77.5 lbs. of paddy per acre. Ripening of the grain was very uneven and some was destroyed in the very young stages by leaf-cutting bees Megachile S.p. Further trials are under way to determine whether as is believed, the soil type is unsuitable to rice production.

Sorghum.

Two crops of a dwarf sorghum, which has given promising results under varied conditions elsewhere, were sown in May and September, 1943. In both cases there was poor germination and weak growth probably due to dry weather and a large proportion of heads produced infertile seeds.

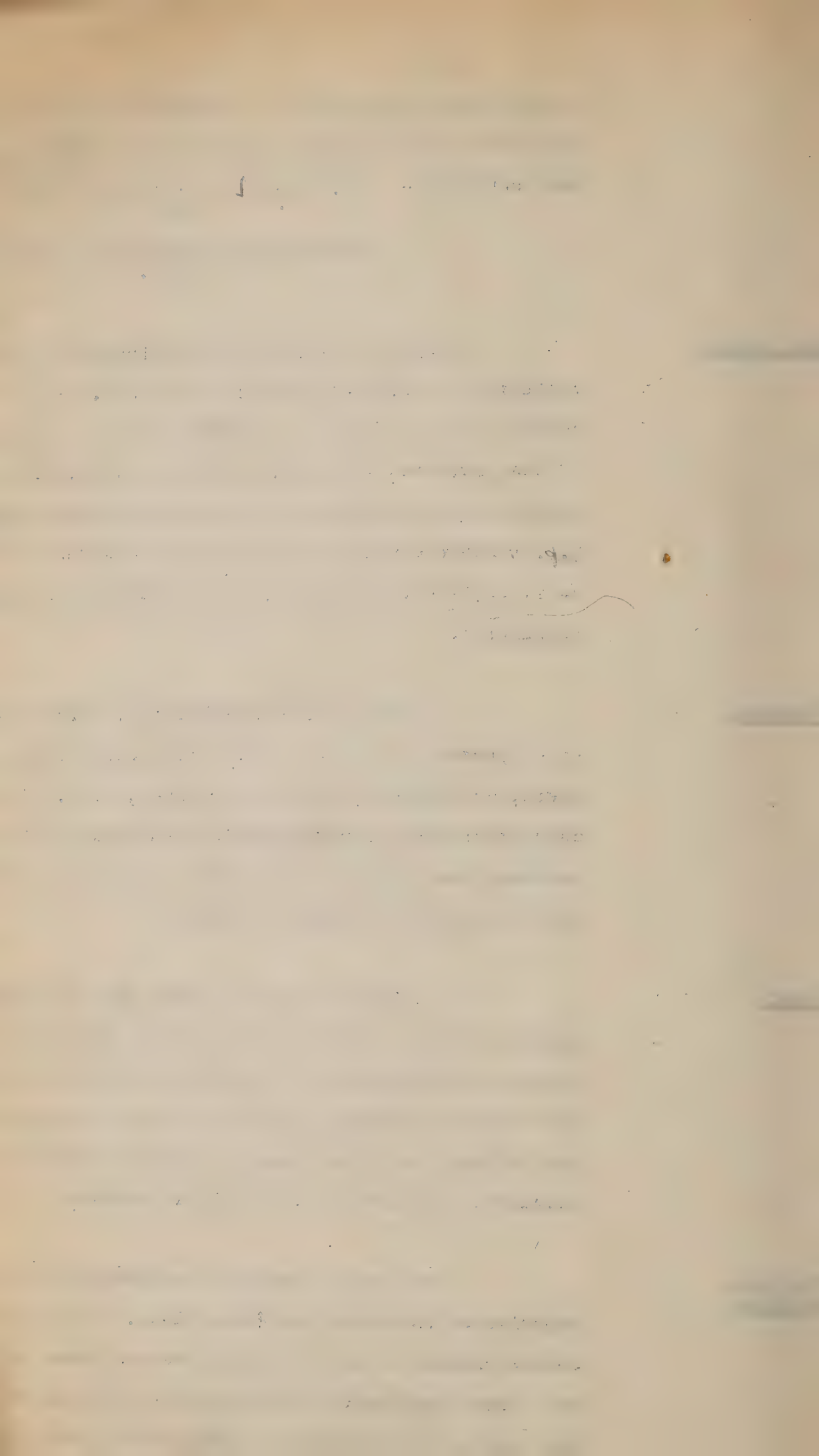
ADLAY.

A 1/20 acre plot of Adlay sown in April 1943 yielded 46 lbs, seed i.e. 920 lbs per acre, but did not mature satisfactorily. A second crop sown in September and reaped in January appeared to give a similar yield but difficulties with labour at the time of reaping ^{made} accurate recording of the yield impossible.

SOYABEAN. VARIETIES

The variety Palmetto was used in two field experiments in Spring and Autumn 1943. In spite of severe drought in June and July the crop sown in May made excellent growth and yielded at the rate of 572 lbs. per acre over the area though some plots in the experiment gave as much as 732.5 lb per acre.

The...



The mean yield of the autumn crop was 393 lbs. per acre.

A black seeded type found growing among Palmetto plants has been isolated and is being multiplied for further investigations.

The large-seeded Trinidad variety did not prove successful when interplanted between avocado trees but yielded satisfactorily in pure cultivation. Less than 100 lbs per acre were obtained from the crop sown in May between avocado and 340 lb. per acre from the ^{pure} crop sown September, 19 43.

Frequency of weeding.

In an experiment carried out with the Trinidad variety, the effect of weeding of the field on soyabean production was determined. A single weeding of the crop was shown to be inadequate for best returns.

The experiment was laid out in 7 randomised blocks and the treatments were:

1. No weeding at all from sowing to reaping.
2. A single weeding 4 weeks after sowing.
3. Weeding at 4 weeks and again at 8 weeks.
4. Weeding at 6 weeks and again at 9 weeks.

The last was intended to consist of three weedings at 3, 6 and 9 weeks- but the field was entirely free of weeds at 3 weeks.

Remarkable differences were obtained as regards the yields produced by the various treatments and also the proportion of the total field weight recorded in each case as clean seed. The results of the experiment are tabulated.

Treatment	Yield lb/acr	Seed wt expressed as a % of field C
1. No weeding	119.0	2.6
2. Single weeding 4 weeks.	401.5	6.6
3. Weeding at 4 weeks and at 8 weeks.	322.1	12.4

(over)

4. Weeding at 6 wks. 817.1 14.3
and at 9 wks.

Further trials are being carried out.

Time of Planting

An experiment was commenced in February, 1944, to determine the effect of seasonal variations on the soybean crop. Two varieties - Palmetto and Trinidad are planted in small plots at intervals of two weeks and records kept of the meteorological conditions as well as of the plants at different stages.

COY PARS.

Five varieties were compared in a trial planted in May 1943. The yields obtained were low generally but ~~among~~ two varieties yielded significantly higher than the others. This advantage was offset, however, by more uneven ripening in these varieties with consequent prolongation of the reaping period. The yields were:-

A C B 293 -	738.2 lb/ao.
A C B 64 -	702.4 "
A C B 387 -	591.2 "
A C B 14 -	528.0 "
Blackeye	463.4 "

Four other varieties were added to the list and a trial with the nine sown in November, 1943. In December the plants were attacked by powdery mildew and commenced to flower early. The young pods developing from these flowers were almost completely destroyed by an exceptionally high infestation of the Green Shield Bug - Nezara viridula.

MUNG BEANS.

In a variety trial with 7 grams of mung beans laid out in April, 1943, the black~~eyed~~ types gave the highest yields. There was great variation in the period from sowing to reaping without any apparent correlation between the length of this period and yield. The varieties are compared in the table

given.

(over)

Variety No.	Colour	Yield	Length of reaping period.	Total period sowing to harvesting.
ACB 344	black	1207.01b	37 days	111 days
ACB 23	black	1032.8 "	28 "	98 "
ACB 420	Green	830.6 "	15 "	200 "
ACB 345	green	648.6 "	11 "	84 "
ACB 292	green	582.6 "	28 "	101 "
ACB 67	green	465.6 "	28 "	101 "
ACB 238	green	298.2 "	48 "	122 "

OTHER PLANTS

Observations and multiplication plots were established with varieties of Pigeon pea, kidney bean, cluster bean and an edible Canavalia.

CASTOR OIL

Seven types of castor, separated, on a basis of seed characters from a mixture imported from the United States, were grown on widely separated plots dispersed over the station. There was extreme variation in the types of seeds obtained indicating a high degree of cross fertilization in the original selections. Further selections aimed at the isolation of stable types are being carried out.

SUNFLOWER

Two crops of sunflower were grown and both gave a fair yield of about 200 lbs per acre. It was observed that though seed of a single variety was used segregation of other types occurred. Owing to the high degree of crossing which occurs in the crop it is not possible to keep pure any variety if others are to be grown within the limits of the station and no selections were made from off types.

SESAME

A small plot of sesame sown in November 1941 showed poor germination and very weak growth. Flowering was premature and additional evidence was obtained of the marked response of this crop to length of day. Planted in spring or early summer under conditions similar to those at Orissa river sesame has been known to give

excellent results.

FIBRE.

Assays of *Sansevieria* and bananas grown on the station were made by an expert from Washington, but the results obtained were not considered sufficiently good for economic extractions of fibre. Observation plots of Luffa, Sann hemp, and Urena varieties have been established.

PARAISI.

Multiplication of three varieties was continued and samples of roots from two of them were forwarded to Washington for determination of rotenone content.

AVOCADO.

Planting of a small orchard with standard commercial varieties of avocado was commenced in the spring of 1943. Eleven imported varieties representing the three races Guatemalan, Mexican and West Indian, have already been established, the location of the trees in the field being arranged so as to alternate rows of A and B flowering types to make for easy pollination at flowering.

CACAO.

Shade trees, *Immortelle* - *Erythrina indica* were established in preparation for variety trials involving six high yielding Trinidad clones. These shade trees are set out in rows approximately 100 ft apart with a distance of 40 ft. between trees in the same row with the purpose of providing shade belts.

BEAN CROPS.

Establishment of a suitable cover crop for beans proved very difficult. *Adue*, *Overlook*, *Jerusalem* - *Pea*, *Bengal Bean*, *Calopogonium*, *Papadonia candida* Bonavia, *Pigeon* *Pea* and a variety of *Mung Bean* ACB 450 have been tried with little success. Suppression of weeds is inadequate and the climbing habit of all but *Papadonia* and *Pigeon* *Pea* is not considered desirable.

SECTION II. SOIL AND SOIL INFESTATIONS.

This experiment, established in the Spring of 1942, consists of a 3 x 3 x 3 randomized layout of treatments involving three levels of application of nitrate -

(over)

phosphate and potash as follows:-

NO	- No nitrate	P ⁰	No phosphate	K ⁰	No Potash
N ¹	200 lb nitrate of	P ¹	200 lb triple	K ¹	100 lb mu
	potash.		super.		late of Po
N ²	400 lb "	P ²	400 "	K ²	200 "
	per acre.				

Each of the 54 plots of 1/40 acre is divided

into 3 and sub-treatments applied as indicated below:

- A - fertilizer applied to every crop
- B - fertilizer applied to 2 successive crops then omitted for two crops.
- C - fertilizer applied to 1 crop then omitted for 3 crops

The third crop planted was maize sown in March of 1943, followed by Soybean variety Palmetto, in October. In both crops fertilizers were only applied to sub-plots A, and the position at the end of the soy bean crop was;

A, - 4 applications of fertilizer

B - 2 " " "

C - 1 " " "

The results are discussed in the report of the Agricultural Chemist.

Preparations were made for the planting of the fifth crop which will be coconuts of the variety- Black-Commander.

An experiment to determine the effect of liming and application of organic matter in different forms was commenced in the Autumn of 1942.

The.....

ORGANIC MATTER
LIMING EXPERIMENT

The layout consists of five randomized blocks with seven main treatments and two sub-treatments.

1. Mulch at 30,000 lb per acre applied May-June turned in September
2. " " 15,000 lb. " " " " " " " " " " " "
3. " " 15,000 lb. " " " " " " " " " " " "
- and 15,000 lb. " " " " " " " " " " " "
- November turned in March.
4. Farmyard manure at 30,000 lb per acre applied in Aug. Sept., turned in same time
5. " " 15,000 lb " " " " " " " " " " " "
- and 15,000 lb per acre applied Feb. March turned same time
6. Green manure crop planted March April turned in Aug. and September
7. Control.

Subtreatments: A. no lime.

B. 1.5x lime requirements applied Aug.

and thereafter every two weeks. years.

For the mulch treatments a mixture of dried *Phaseolus*, elephant grass and uva cane obtained when contour barriers were cut was used and the *Adiantum* *edulis* - was the green manure crop employed.

The second crop sown in the experiment was soybean variety Palmetto in May 1945, and the third crop maize in October. A basic dressing per acre of

2 cwt Nitrate of soda
4 cwt. triple super
2 cwt. Muriate of potash.

was applied to the maize crop.

The results obtained have been analysed and reported on by the Agricultural Chemist.

In view of the extent to which topsoil in many areas derived from Richmond beds has been lost through erosion a trial was designed to obtain information on the rate at which the subsoil in this series weathers on exposure and on methods of rendering it fertile. Large terraces have been cut on a gently sloping hillside and covered to a depth of 12 inches in each, ^{each} with one of the following materials:-

Topsoil....

Topsoil 0 - 6 in. zone
 Subsoil 6 - 12 in. zone
 subsoil 12 - 18 in. zone and
 parent shade 2 ft. and more below the surface.

OFF 11. SUBSOIL. OF SUBSOIL. OF.

GRASS BARR OR BARRIERS.

Observations were continued on this method of soil conservation and the results obtained in 1942 confirmed. Additional information was obtained on some aspects of the practice.

Tr. nehina.

Contour trenches 2'x 18" in cross section with a fall of 1:100, in place of the standard fall of 1:100 generally used, carried surplus water from beds about 22 feet wide and up to 10 chains in length without overflowing where carefully graded, but in a few cases where the grading did not continue uniformly throughout their lengths, some silting up, overflowing and scouring occurred during heavy rain.

Barriers.

Observations to date suggest that only strong rooted, upright grasses, closely spaced, effectively check erosion of soil from the bed above and /the species so far grown for the purpose only *Amakhus*, *Vetiveria zizanioides*, spaced initially 6 inches or less apart at planting develops a really strong root system and a compact barrier within a reasonable length of time. Elephant grass, *Elephantia purpurascens*, which forms an effective filter in three to four months but grows too tall and makes stools too wide to make it use satisfactory except on very wide beds; Guinea Grass, *Panicum maximum*, tends to grow patchily and has a relatively weak root system; Lemon Grass, *Cymbopogon citratus*, makes an exceptionally compact filter but possesses a very weak root system. Other upright grasses which have been tested but proved inferior under conditions

at Orange River are Guatemala grass, Tripsacum daniellii, Uba cane, Saccharum spontaneum, which tiller loosely and tend to die out when cut oftener than twice a year, and an ornamental cane S. ciliare, which does not tiller sufficiently. Sour Grass, Paspalum conjugatum planted as a barrier in the autumn of 1943 grew satisfactorily at the beginning but died out in patches after about six months.

The effect of the shade of crop plants on these barriers is remarkable, the response varies according to the species used as barrier but in each there was less growth and a less efficient filter under shade. In two parallel trials where the grasses were grown as barriers (1) with a tall crop which shaded them and (2) with a low growing crop offering no shade, cutting was carried out every two months and the yields of green matters, tabulated below, gives an indication of the development:-

Barrier	Shade	No Shade	Ratio
Khuskhus	34	111	3.3
Lemon Grass	32	119	3.7
Elephant "	84	204	2.4
Guinea "	35	134	3.8
Guatemala "	74	153	2.1
Uba Cane	22	115	5.2
S. ciliare	-	36	-
Sour grass	-	23	-

Average No. of lb. green matter per acre chain per cutting in 1943-44.

None of the semi-recumbent and recumbent grasses tried have effectively checked erosion when kept as thin barriers and all tend to encroach into the cultivated beds. Bahama grass, Cynodon dactylon, Savannah grass, Axonopus compressus, Crab grass, Eleusine indica, Molasses grass, Melinis minutiflora, American blue grass, Panicum polyanthes, and Amphipogon perfoliatus, have been tried.

Non-raginese plants tested so far are Alternanthera tricolor, A. ficoidea, both of which have proved quite valuable and Sansevieria guineensis, which after two years had still failed to produce a uniform barrier but was already sending stolons many feet into the cultivated bed.

The question of encroachment of barrier, planted into the cultivated area is one of prime importance and has demanded no small amount of attention. Elephant grass which is widely used is particularly noticeable in this connection and its spread must be controlled in order to prevent relatively rapid reduction of effective bed width. A simple experiment was commenced in November, 1940, in a field planted with elephant grass barriers with a view to finding a method of dealing economically with the encroachment problem. The following treatments:-

- (1) Establishment of a buffer line of lemon grass between barrier and cultivated bed.
- (2) Removal of encroaching tillers every 6 weeks.
- (3) " " " " " " 12 "
- (4) " " " " " " 6 months
- (5) " " " " " " 12 ".

are being applied (a) at time of planting (b) after one year's growth of the barrier. Lemon grass was selected for the buffer on account of its closely packed tiller which do not tend themselves to encroaching. Records are being kept of costs and rates of development of the barriers.

TILLAGE BY HAND- RAILS.

On contoured slopes that had been in cultivation for a year or two, small turnwrest or hillside ploughs drawn by a single male have done satisfactory work and observations suggest that fewer small rills form during rain on ploughed beds than on those forked. For ploughing on raw land and particularly heavy patches two steers may be required in place of a male.

Different.

Different types of small harrows, cultivators and singlerow seed planters have also been used satisfactorily with a single mule and a petrol-driven garden tractor has been acquired for trial.

STRIP CROPPING

In the small area of steep land with slopes approximately 40° which was strip-cropped with alternating contour belts of grass and arable it was found that the widest strips ranging from 25 to 30 feet were ^{more} satisfactory than narrower strips, in that the fodder grasses planted in the latter tended to encroach into, and over shadow, the cultivated areas, but on the other hand there was considerable downward movement of soil in evidence in the wider beds. Of the grasses planted in the alternate strips, Elephant grass appeared to be the most satisfactory and produced substantial quantities of fodder or mulch when cut at ~~two~~⁸ weeks intervals.

MANITO CULTIVATION

A steep hillside with a mean gradient of about 1:1 was cultivated on the system by the ^{evolved} Matengo in East Africa. The land was cleared in August, 1943, and the debris arranged in rows, approximately 10 feet apart at right angles forming a grid. The earth in the squares was then dug out down to subsoil depth and pulled on top of the rows of debris on all sides so that when preparation was completed the area presented an appearance of pits and ridges.

The first crop grown was sweet corn planted on the ridges in September. ^{Cum} Cultivation was maintained, all weeds were put into pits as were crop residues at harvest. For the second crop, sunflower, sown March, 1943, the old pits were filled and new ones made at intersections of the old ridges.

Observations.....

Observations suggest that there was some check to erosion as silt and water collected in the pit during rain. On one occasion, however, there was some scouring when some pits overflowed. The large amount of labour required by this system may render its cost prohibitive under nearly all conditions in Jamaica.

RE-AFFORESTATION.

The variety plot of timber trees planted on a steep, and in places severely eroded, ridge was maintained. Cedar has been attacked by a moth borer-Hypsila^{sp}, and some trees appear to be drying out. Mahoe and fiddle wood continue to be promising as does teak growing on the bank of a stream.

SECTION 11. SUB-HEAD 6. AGRICULTURAL EDUCATION.

JAMAICA AGRICULTURAL SOCIETY.

The scheme for training of the field personnel of the Jamaica Agricultural Society by the Department of Agriculture came into operation in 1943 and two newly appointed Agricultural Instructors underwent a six month course of training at Orange River from September, 1943, to March, 1944. They received instruction and some practice in modern farming methods with particular reference to the maintenance of livestock and field crops on both small and large holdings. They were also made familiar with the interpretation of experimental results and their application to the growing of staple crops.

Valuable extension work was also carried out with the collaboration of officers of the Society; two meetings of the St. Mary Branches Association were held on the Station and field days were arranged for several individual branches.

PLANTING MATERIALS.

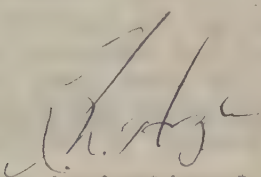
Large quantities of grass planting materials were distributed, the demand was mainly for Elephant grass for contour barrier.....

carrier work but appreciable amounts of khuskhus, lemon grass and guatemala grass were also sent out. Supplies of inoculum for soybeans were maintained and seeds of crop varieties were made available to other Government institutions.

MISCELLANEOUS.

A few implements were loaned to planters for trial and demonstration purposes and free access to the books and periodicals of the reference library was allowed the public under certain conditions. Both the number of visitors to the Station and the number of enquirers received on varied subjects increased during the year.

E. A. Tai
Asst. Agric. Officer, Officer-in-charge.


Senior Agricultural Officer, E.D.

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BANANAS.

Panama Disease. The control of this disease was carried out among small farmers by the Agricultural Instructors in the districts concerned, these latter being provided with an imprest for payment of labour employed when this was necessary. On larger properties the owners themselves generally carry out routine control methods on their own account. In the Western and Central areas of the island the fight against Panama Disease is certainly worth while and even in the Eastern parishes there are small areas where some measures of artificial control is desirable. In St. Mary the parish as a whole may be looked upon as a 'salvaged' area, though the natural spread of the disease is in many cases slow, and though there is only one area in which instructors are regularly carrying out control operations among small farmers.

Black Spot of Leaves. During February, in the West end, at higher altitudes (E.G. near Maroon Town) a small regularly distributed black 'pin spot', similar to that on fruits was observed on leaves of Bananas. Gunning of one or two cells of the upper epidermis and the palisade cells immediately below takes place, causing the spots which are confined to the upper surface.

Fungi on Banana Leaves associated with Speckle etc. The weakly parasitic fungus causing a type of speckle subsidiary to that due to *Chlorophyllum musae* has now been described at the Imperial Mycological Institute and finally referred to the genus *Cladosporium*, as *Cladosporium musicola* sp. nov. which has also been recorded from West Africa. The common epiphyte also found on the lower surface of the Banana leaves with peculiar twisted conidiophores, has likewise been described at the Institute, as *Zygophiala jamaicensis*, gen. nov. sp. nov. It is most nearly related to *Zygosporium*. *Zygosporium oscheoides* Mont. has been found epiphytic on the lower surface of Banana leaves from one or two localities.

SUGAR CANE.

There have been no disease of this crop referred to the Division for advice during the year. Mosaic Disease presents a number of interesting problems, especially as regards the apparent tolerance of certain promising varieties such as B 34104, which though exhibiting distinct mosaic symptoms in young cane appears to a great extent to 'grow out of the disease', and to suffer little or no ill effects from it. There are also indications that more than one form of Sugar Mosaic Virus may be present in the island.

COCONUTS.

The diseases of this crop have been made the object of detailed study during the year, with especial reference to Bronze Leaf Wilt. A pamphlet for planters dealing with the diseases of Coconuts in Jamaica was published during the year.

Bronze Leaf Wilt. This disease caused considerable alarm to planters when fresh cases were reported in the Duncans area during the summer of 1943. Earlier in the year, the acquisition by Government as an Agricultural Centre of Haughton Court, Lucea, a Coconut property on which Bronze Leaf Wilt had assumed epidemic proportions, enabled a detailed investigation of the disease to be undertaken under conditions where a variety of experiments could be conveniently carried out.

It having become clear that the previously accepted explanation as to the causes of Bronze Leaf Wilt did not satisfy the observed and recorded facts in Jamaica, it was decided that until the true nature

of the disease was ascertained, it should be dealt with as if it were infectious. The Trelawny planters, who were on the outskirts of the area hitherto affected by the disease, and therefore especially concerned by the new cases reported East of Falmouth, in the Duncans - Braco area, cooperated with Government in a vigorous campaign of cutting and burning all diseased trees, the neighbourhood of Salt Marsh Bay being the area in which the major sanitary measures were carried out. Subsequently this policy was also put in practice on the St. James and Hanover Coasts, where for some years cutting down of diseased palms had been largely neglected. In November Legislation was enacted to enforce the cutting down and burning of Bronze Leaf Wilt if necessary.

As a result, at the end of April, the whole coast had been cleared of diseased Coconuts, entailing the felling of over 18,000 palms. It now remains to follow this up by the clearance of new cases as they occur. In the majority of areas this will probably entail the gradual elimination of the few remaining Coconuts until none are left, but in the Round Hill - Tryall area there are still properties where it is hoped that the disease may continue to be kept from assuming epidemic proportions throughout. It is also to be hoped that the disease, which at present is not found West of Lance's Bay, will not spread further in that direction.

Experimental work at Haughton Court and elsewhere included the search for a bacterium or fungus to which the disease might be attributed, and inoculations with bacteria obtained from the rotted heart. The experience of previous investigators was repeated, and only negative results were obtained. Other experiments were designed to investigate the possible virus origin of the disease, and a number of attempts were made to induce artificially conditions of wilt - hitherto considered the cause of the disease. Although a number of interesting observations resulted from the latter, no symptoms similar to Bronze Leaf Wilt were obtained artificially. In addition the suggestion that the disease was caused by the presence or absence of some chemical constituent in the soil was investigated.

St. Mary Disease. A number of slightly varying diseases, the symptoms of which become apparent on the young leaves near the centre of the Crown, can be grouped under this name. Diseases of this nature are confined in general to wet areas, and in consequence become more prominent after a wet year. Many instances were noted in Portland in 1943 that were directly attributable to the abnormal rains of 1942-43. In general the leaflets of the affected leaves tend to dry up and wither in varying degree, and examination shows the midribs of the affected leaves to contain internal splits and areas of rotted tissue, presumably originating when these leaves were emerging from the heart during wet weather. In most cases the disease ceases to affect the palms concurrently with a return to normal weather conditions. It will be made the subject of further investigation when abnormally wet weather reoccurs. Examination of palms at this time, in areas subject to the disease, will probably disclose more fully the precise origin of the symptoms above described. These do not become apparent until the leaves have taken their place in the crown, often some time after the causal factors were in operation.

Drought Wilt. Palms were observed dying at Albion, near Yallahs, in this very dry area, where previous irrigation had been cut off with the abandonment of certain areas of Bananas. Coconuts in these areas began to wilt, the outer leaves drying up and collapsing, this loss of leaves continuing fairly rapidly until finally the heart died. The death of these palms was entirely attributable to lack of water. Individuals showing similar symptoms may also be seen in dry areas of lower St. Andrew during droughts. Death of the palms is caused by a true wilt, and the symptoms are quite distinct from those of Bronze Leaf Wilt. Death of Coconuts in a similar manner has been also recorded in Ceylon.

At Morant Bay palms growing by the sea shore near the Fish Market in an area where the town rubbish is dumped, and the soil level consequently raised, were also observed dying with sympt.

rather similar to those of 'Drought Wilt'. The dead palms were confined to the area of rubbish, the neighbouring palms remaining perfectly healthy. The exact correlation between cause and effect is a matter for speculation. Possibly the raising of the soil level with matter in which formation of fresh roots is largely inhibited upsets the proper aeration of the root system and causes the death of the palms.

Die Back. The Die Back of Palms, seen in varying degree all over the island, has also been kept under observation. It generally entails the drying out and withering, to varying degree, of the leaflets of the outer leaves. A chronic condition of this nature is often apparent in palms on the North Coast growing on shallow clays above Coast Limestone, and in general palms on shallow soils over Limestone show it in varying degree. Sometimes the die back results in the greater part of the leaves withering, more quickly than they are replaced, and in time the palms die. Isolated cases of this nature on soils overlying rock near the surface are probably due to the rock below. In other cases however this die back affects palms, sometimes still young, on alluvial soils derived from Limestone and containing many water borne stones, such as are commonly found in the alluvial flats at the mouths of many of the island's rivers. These soils should be ideal for coconuts, and the occurrence of excessive die back on them must be ascribed to some nutritional cause, but its exact nature is in doubt and it is being made the subject of investigation.

Chlorosis. Various types of chlorosis were observed among coconuts on Richmond Bed soils and on Rendzina soils - i.e. alkaline soils derived from soft Limestone or Marl, which are usually deficient in available phosphate. Where the soil is shallow and during dry weather, palms may assume a very marked chlorotic condition, sometimes mistaken for Bronze Leaf Wilt, but in general they largely recover when the rains come. This type of chlorosis is quite distinct from that caused by bad drainage, and is usually of a more intensive shade of yellow.

CITRUS.

Fruit Drop. An abnormal dropping of fruit was reported from the Cambridge Valley in the autumn, especially at Seven Rivers. Investigation and enquiry at the latter property indicated that the trees, which were about 7 years old, had blossomed unusually early - in February and March rather than April - and in dry weather, which resulted in a very heavy crop being set. The area where the fruit drop took place was on a very 'shotty' soil, of poor quality. There was an abnormal amount of rain prior to and during the occurrence of the fruit drop. It seemed probable that in the poor soil, in a rather waterlogged condition, the trees were unable to carry their exceptionally heavy crop. The matter seemed to be chiefly correlated with the soil conditions, and these were investigated by the Agricultural Chemist.

Stylar End Rot. This disease was investigated at Trout Hall, where it affected some young (4 years old) Valencia Orange Trees. The fruit was being carried on the trees prior to picking, and diseased fruits showed an unnatural dark orange redening, especially over the lower half. Around the stylar cavity was a brown roughly circular area, up to 8 mm. in diameter, usually more or less centered on the cavity, sometimes slightly eccentric, and generally somewhat sunken, but smooth and firm. On cutting open affected fruits, in some cases there was a slight gumming of the tissues immediately below the surface, in others a slight discolouration of the surrounding underlying tissues; in a few cases a fungal rot had started down the centre of the fruit.

There had been an unusually dry spell and no rain for some weeks, the ground appeared very dry, and some of the trees were beginning to show 'quailing' of the foliage. The disease therefore appeared to be caused by curtailment of water supply to the ripe fruit of a fair

heavy crop on young trees, and akin to Blossom End Rot of Tomatoes. It is similar to the Stylar End Rot of Citrus fruit described in the U.S.A., though not accompanied by the cracking of the fruit at the stylar end, as figured there.

Affected fruit was kept in the Laboratory for a week, by which time they had fully ripened without any rotting extending from the original gummed area below the style. It seemed that such fruit therefore could safely be held on the trees so long as the dry weather continued without suffering any very serious damage. Onset of rain to any extent would probably cause the fruit to start falling and necessitate picking in any case.

MINOR CROPS.

LEGUMES.

Cow Peas. ? Sun Scorch. Cow Peas were received from Trout Hall in June showing lesions and scabs on the pods and stems similar to those ascribed to 'Sun Scorch' of Peas and Beans in the U.S.A. in hot weather. No insects or fungi to which the condition of the plants might have been otherwise attributable, could be found.

Red Peas (Phaseolus vulgaris) - Mosaic. Varieties of Bean from the U.S.A. resistant to Mosaic were grown at Grove Place but did not give satisfactory results under local conditions, suffering badly from mosaic. The varieties concerned were Idaho Refugee, Sensation 1066 and Sensation 1071.

TOMATOES.

Watery Rot, from Growth Cracks. Ripening fruit from Sligo Ville was seen in June to be cracking and splitting at the stem end. Several varieties were affected. The cracks callus over, but often before this can take place insect injury accompanied by bacteria or fungi occurs, causing a watery rot of the whole centre of the fruit, which may not become apparent until it is picked and set aside to ripen, when the water runs out.

The cracks are probably due to some irregularity in the water supply, and the plants were growing on Red Limestone soil which dries out very readily on the surface. Mulching was recommended.

ELEPHANT GRASS - Pennisetum purpureum Schum.

Leaf Spot - Helminthosporium sacchari Butl. The leaf spot due to this fungus is sometimes destructive, especially in the autumn and winter passing off in the spring. The remedy appears to be to cut the grass before serious spotting takes place - the subsequent ratoon coming up fairly clean. Napier grass, another variety of P. purpureum, is immune to the spot, but is not so good a fodder, carrying less foliage. A Uganda variety of Elephant Grass received from Trinidad and said to be resistant to the disease is now under trial but this too tillers less than the local variety.

An outbreak of Leaf Spot in a field of Elephant Grass at Hope was only serious on one patch of poor soil.

NEWLY RECORDED DISEASES.

The following diseases were recorded for the first time in Jamaica

Artichoke (<i>Helianthus tuberosus</i> L.)	Leaf Spot	<u>Cercospora</u> sp.
Avocado Pear	Algal Rust	<u>Cephaleuros mycoidea</u> Karst.
Bean, Cluster (<i>Cyamopsis psoraloides</i>)	Root Rot	<u>Sclerotium rolfsii</u> Sacc.

Bean, Lima	..	..	Leaf Spot	<u>Cercospora canescens</u> E & M.
Cabbage, Chinese	..	..	Leaf Spot	<u>Alternaria oleracea</u> Milbrath
<u>Calotropis procera</u>	..	..	Leaf Spot	<u>Cercospora</u> sp.
Castor Oil	..	..	Leaf Spot	<u>Cercospora ricini</u> Sacc & Bul
Citronella Grass (<u>Cymbopogon nardus</u>)	..	..	Mosaic	Virus
Cow Pea	..	..	Root Knot	<u>Heterodera marioni</u> (Cornu) Goodey
Elephant Grass (<u>Pennisetum purpureum</u> Schum)	..	..	Leaf Spot	<u>Helminthosporium sacchari</u> Butl.
Jerusalem Pea (<u>Phaseolus Munge</u>)	..	..	Root Knot	<u>Heterodera marioni</u> (Cornu) Goodey
Mahogany (<u>Swietenia mahogani</u> Jacq.)	..	..	Damping Off	<u>Diplodia</u> sp.
Onion	..	..	Leaf Blight	<u>Macrosporium parasiticum</u> Thum.

Soft Rot Erwinia carotovora (L.R.Jones) Holland

The Leaf spot recorded last year on Angel's Trumpet, Datura suaveolens, as Cercospora sp. has been identified as C. Abchazica Siemaszko, and the fungus causing Fruit Rot of Loofahs and recorded as Macrophoma sp. has been identified as Botryodiplodia theobromae Pat.

OTHER DISEASES RECORDED AND INVESTIGATED.

Avocado Pear	..	Scab	<u>Sphaeloma perseae</u> Jenkins
"	..	Sunscald of Fruit	Non-parasitic
Carrots	..	Blight	<u>Macrosporium carotae</u> Ell. & Langlois
Cassava	..	Leaf Spot	<u>Cercospora henningsii</u> Allesch.
Celery	..	Early Blight	<u>Cercospora apii</u> Fr.
Citrus - Grapefruit	..	Die Back	<u>Botryodiplodia theobromae</u> Pat.
Lime	..	Stem Knot	<u>Sphaeropsis tumefaciens</u> Hedges
Sour Orange	..	Scab	<u>Elsinoe fawcettii</u> Bitanc. & Jenkins
Cocoas (<u>Colocasia</u> sp.)	..	Salt Petre	<u>Vasculomyces xanthosomae</u> Ashby.
Coconuts	..	Bud Rot	<u>Phytophthora palmivora</u> Butl.
	..	Bitten Leaf	Heart damage
	..	Leaf Spot	<u>Pestalotia palmarum</u> Cooke
Coffee	..	Leaf Spot	<u>Cercospora ? coffeicola</u> Berk & Cooke
Corn	..	Ear Rot	<u>Fusarium moniliforme</u> Sheldon
	..	Smut	<u>Ustilago zae</u> Unger
Cotton	..	Anthracnose	<u>Glomerella gossypii</u> Edgert
	..	Areolate mildew	<u>Ramularia areola</u> Atk.
Cow Pea	..	Leaf Spot	<u>Cercospora cruenta</u> Sacc.
	..	Mosaic	Virus
	..	Powdery mildew	<u>Oidium</u> sp.
Egg Plant	..	Blight	<u>Phomopsis vexans</u> (Sacc. & Syd.) Harter
Ginger	..	Black Rot	<u>Rosellinia ? bunodes</u> (Berk. & Br.) Sacc.
Onion	..	Leaf Disease	<u>Alternaria porri</u> (Ell.) Neergaard
Papaws	..	Mosaic	Virus
Potatoes	..	Scab	<u>Actinomyces scabies</u> (Thaxt.) Gussow
Red Peas	..	Rust	<u>Uromyces appendiculatus</u> (Pers.) Link
Rice	..	Leaf Spot	<u>Helminthosporium oryzae</u> Van Breda
Rose	..	Black Spot	<u>Sphaerotheca pannosa</u> (Wallr. Lev.
Sisal	..	Anthracnose	<u>Colletotrichum agaves</u> Cav.
Soja Bean	..	Mosaic	Virus

Sugar Cane .. Eye Spot
Sweet Pepper .. Anthracnose
.. Leaf Spot
.. Mosaic
.. Sun Scald

Helminthosporium sacchari Bat.
Colletotrichum nigrum Ell.
Gercospora capsici Heald & Wot.
Virus
Non-parasitic...

HERBARIUM.

A Herbarium collection of dried specimens and material in sp... representative of the Diseases of Economic Plants in the island, been started, and will be augmented in future as opportunity offers.

METEOROLOGY.

The Meteorological records made by the Department in recent y have been scanty and unsatisfactory. This condition is to be recti and observatories set up at the Department's Experiment Stations at these are developed. A start was made with the setting up of a new observatories at Hope and Orange River Experiment Stations and a mo careful checking of data from Castleton and Cinchona. This work was carried out under the directions of the Plant Pathologist.

PUBLICATIONS ETC.

'A Preliminary List of Plant Diseases in Jamaica' prepared joi with the Government Botanist and referred to in last year's report published as 'Mycological Paper No. 8' by the Imperial Mycological Institute, for whose assistance in preparing and editing the list r publication we are extremely grateful.

A pamphlet on the Coconut Diseases of Jamaica was prepared for distribution to registered planters by the Coconut Marketing Board for subsequent publication in the Jamaica Agricultural Society's Jour

The Plant Pathologist undertook the preparation of a Summary of Jamaican Legislation relating to Agriculture and Forestry, with esp reference to the Laws, Rules, Regulations etc. relating to the Impor tion and Exportation of Agricultural Produce.

LEGISLATION.

A new Bud Rot and Wilt Disease of Coconuts Order, of November 1943, was published in Jamaica Gazette Supplement, p. 221. It enfor the felling of Coconuts affected by both Bud Rot and Bronze Leaf Wil and the destruction of the Crowns of the palms by fire. The Bahana T Order was amended to enable use of trash for mulching Citrus (Jamaic Gazette Supplement, 1943, p.137).

IMPERIAL MYCOLOGICAL INSTITUTE.

Thanks are again due to the Institute for their assistance in t determination of fungi sent for identification.

E. W. Martin

Plant Pathologist.

8th May, 1944.